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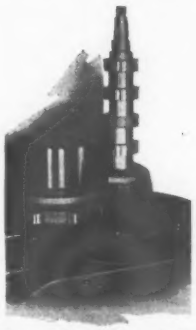

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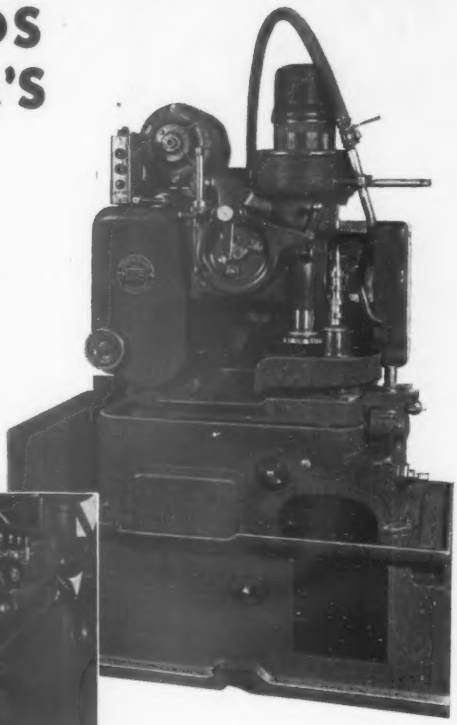

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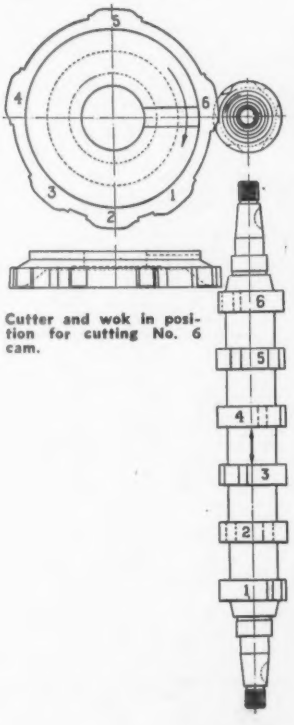

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Vol. VII AUGUST, 1938 No. 4

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Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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HYDRAULIC PRESSES

THE SPIRIT OF PROGRESS

AN EDITORIAL

BY

A. E. RYLANDER

AS WE write this, the stage is being set for a new epic in A.S.T.E. history; we're going on to bigger and greater things. The Semi-Annual Meeting, to be held in Pittsburgh, will attract members and friends from twenty-two—or more—Chapters, while the Tool Show, projected for next March, will doubtless draw many thousands from the far reaches of the land and from abroad. That, men, is Progress!—unparalleled by any other engineering society in the world. For consider that the greatness which A.S.T.E. has achieved has taken place in seven short years, truly a phenomenal growth. And we're still growing, fast.

But, this growth brings on its problems, problems that must be faced and resolved. A non-profit corporation, we have no particular incentive to amass money, except as it be diverted to the promotion of Tool Engineering and except as a healthy reserve is desirable. But, growth creates demands on resources, most of which can be reckoned in terms of man hours and man willingness. For except for a small office staff and one salaried—and very capable—executive, the A.S.T.E. is staffed by its officers and committees. That is why we can operate on extremely low dues, why, when projecting our shows and other activities, we give value, in service, far beyond the very nominal charges necessitated. And that is why the eyes of the engineering and industrial world turn toward the A.S.T.E. for leadership in Progress.

Having set a pace, we must carry on, must maintain standards that have been established. We cannot go back, only forward. By now, several A.S.T.E. activities have become national institutions, notably the Standards Committee and "The Tool Engineer." With the growth in membership, there comes an increasing responsibility on the Standards Committee, more detail, more mailing, more research and checking, considerably more correspondence. What is the end, when the end isn't even in sight?

For "The Tool Engineer," soaring toward leadership in the technical field, with an ever-increasing circulation and reader-interest, there is a growing responsibility on the publisher and on the small staff that comprises the Editorial Committee. Here, meticulous standards must be maintained, in technical subjects, in features and editorial matter, in the service to advertisers. It is a man-sized job, gladly performed but with vigilance the watchword; it is just that the Society's growth taxes the human resources of the men who do the work.

This, then, is merely a plea for consideration during a period of transition, of growing pains. It is not an apology, for we are conscious of our worth, as we are conscious of the aptitude and qualifications of all men appointed to positions of responsibility within the Society. Now, spurred on by our fellows, we slowly but surely effect changes, evolve improvements, face problems and plan solutions. Be with us, as we go on to bigger things; the Spirit of Progress marches on.

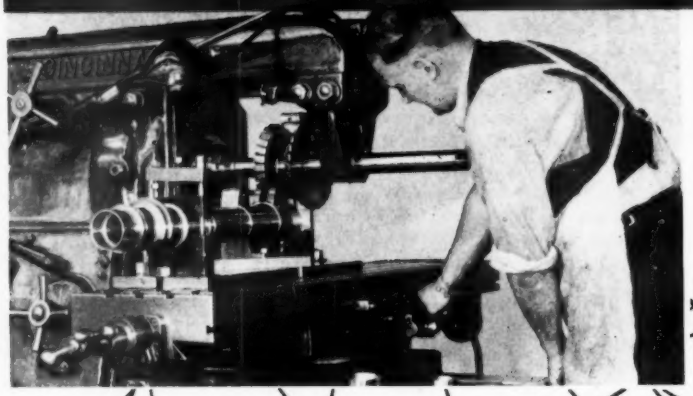
A GOOD TIME TO THINK

MOST of us get by with as little downright thinking as we can. Few, if any, of us ever "philosophize" in these "modern" times. Yet how interesting life can be when engineers get together to think out loud to each other—or to philosophize.

Remember, years ago, how people used to sit on the front porch? Summer evenings instead of burning up the roads, the whole family used to "just sit and talk." They found real pleasure in observing many things—or exchanging bits of wisdom with the neighbors. It all brought about a contemplative life—in which we were more alert to the times and trends. They were as happy as we are.

We recommend it as a mighty nice diversion these warm days, in place of buying fun in the theatre, the dance hall, or the "club." This is a good time to try it.

NATIONAL Reliability



Left and below: Typical machining operation and Aeroplane parts, using NATIONAL Tools.

Reliability

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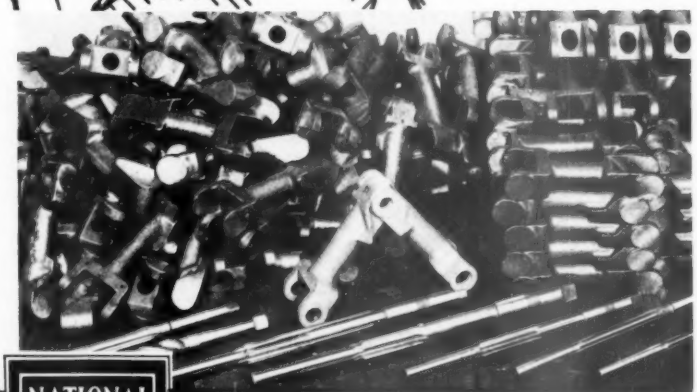

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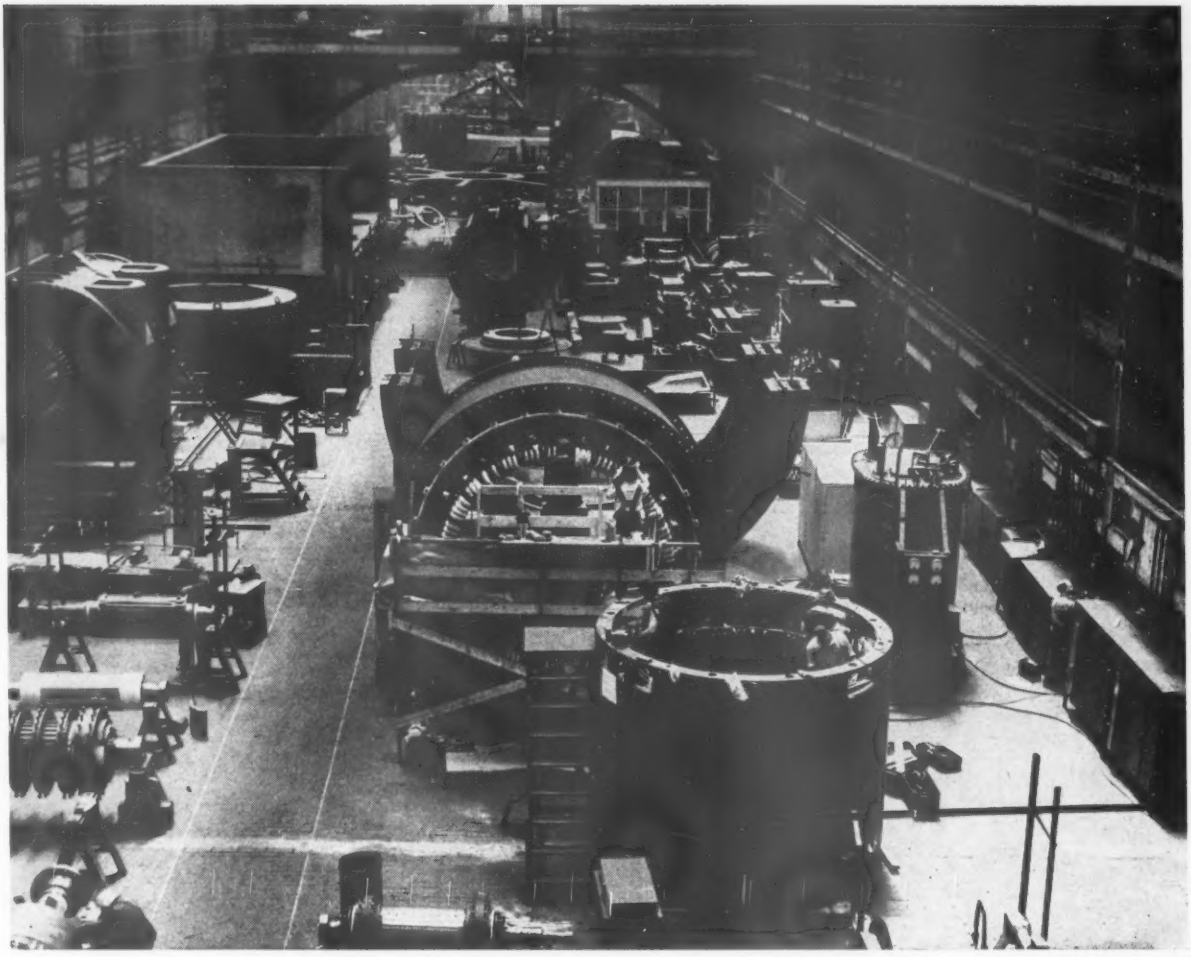


Among the mammoth plants to be visited by A.S.T.Eers and their friends is the huge East Pittsburgh Works of the Westinghouse Electric and Manufacturing Company. When completed, the large cylindrical steel frame (shown in the foreground of this picture taken in the Westinghouse plant) will be a vertical synchronous motor whose 12,500 horsepower will drive one of the battery of pumps which will force the waters of the Colorado River into Southern California. This is but one of the thousands of giants and pixies of the industrial wonderland Pittsburgh will offer the visiting Tool Engineers.

PITTSBURGH--*Host to A.S.T.E.*

Semi-Annual Meeting

October 14th and 15th

October 13 will be a very lucky day for many A.S.T.Eers and their friends who journey by train, plane, motor car, and by steamboat to Pittsburgh—scene of the American Society of Tool Engineers' Semi-Annual Meeting, October 14 and 15. Lucky, because it will provide a splendid opportunity to see the mammoth industries of the Pittsburgh area, mingle with other Tool Engineers, and generally to have an inexpensive yet highly profitable and interesting two-day sojourn to one of the most important industrial centers of the nation.

Plans for the important Semi-Annual Meeting of the Society were drafted and partially completed at a meeting of the Executive Committee and Committee Chairmen held at Detroit National Headquarters July 19. Under the chairmanship of James R. Weaver, First Vice-President of the American Society of Tool Engineers, and Chairman of the "On to Pittsburgh" Committee, a splendid program, educational and entertaining, has been prepared. Great enthusiasm has been shown on the part of those members who have heard of the projected plans, and it is anticipated that a very substantial portion of the A.S.T.E. membership will avail themselves of this occasion to visit Pittsburgh and see the various important manufacturing plants in that area, as well as to attend the important technical sessions and participate in other features of the program which are of specific interest to the Tool Engineer.

Tentative Program Announced

The first day of the Semi-Annual Meeting, Friday, October 14, will be largely devoted to a wide variety of plant tours around Pittsburgh including such important plants as the Westinghouse Electric & Manufacturing Company's plant at East Pittsburgh; National Tube; Mesta Machine; the Mellon Institute; the Carnegie Museum; Blaw-Knox Corporation; and others. Friday night an inspirational session and dinner are planned for the entire membership and their guests and friends.

Saturday morning there will also be a technical session for members while the Board of Directors holds its semi-annual meeting. Saturday afternoon,

(Continued on page 28)

PROCESSING CYLINDER BORES

By KIRKE W. CONNOR
PRESIDENT
MICROMATIC HONE CORPORATION

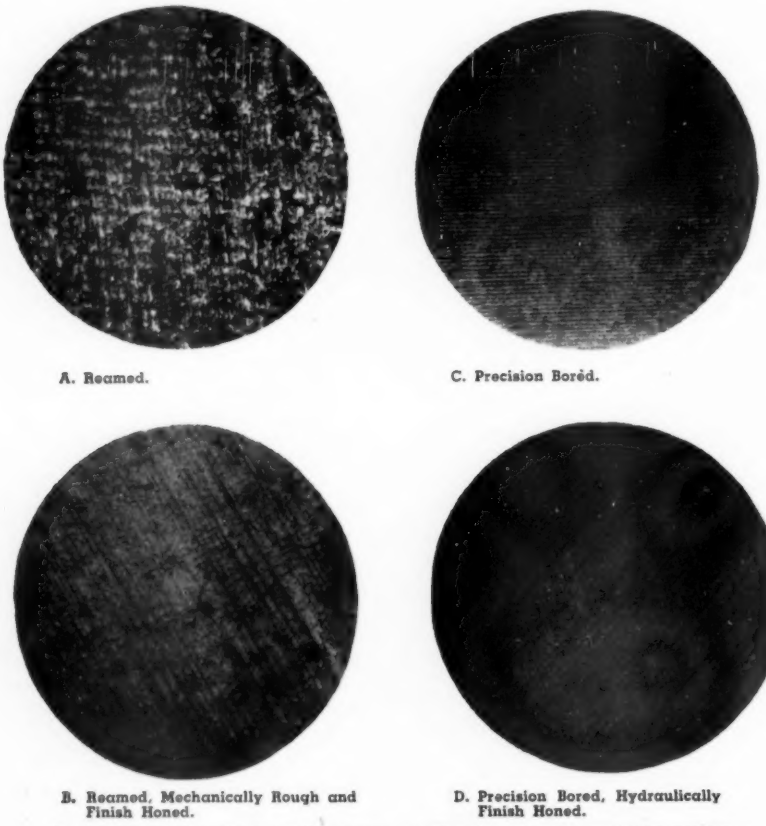
In a paper presented at the last annual meeting of this Society, Mr. Harold Johnson, of the Packard Motor Car Company, very capably outlined the functions of the Tool Engineer in securing the proper tools and equipment required for efficient, economical manufacturing process. It will be the purpose of this paper to survey the methods now being used in processing practice in the internal combustion engine industry for producing cylinder bores, and to report the trend toward adoption of improved methods and newly developed equipment in the direction of simplified processing.

General

THE SELECTION of machine and tool equipment which will most efficiently generate alignment, size, accuracy and final surface finish in cylinder bores becomes increasingly important as the number of processing operations is reduced. Many years ago, when it was universal practice to use no less than six or seven operations, due to limited efficiency of cutting tools, it might be said that each operation comprised an individual or single function. It was the function of several boring operations to remove scale, generate alignment—including squareness and parallelism—and prepare the bore for later sizing and finishing operations. Rough sizing was accomplished by one or more reaming operations, or by coarse grinding. Limited correction of error in alignment, final sizing, accuracy and surface finish was accomplished by relatively fine grinding. All grinding in cylinder block bores was superseded, approximately eight or nine years ago, by the honing process. Honing was found to be more adequate in meeting high production requirements, contributed substantial improvement in accuracy, developed and introduced a new degree of control of surface character and finish, and was considerably less expensive than grinding.

The trend in processing development has been consistently progressing toward multiple purpose operations, and the reduction of the total number of operations in combined processing. Notable improvements have been made in machine design, spindle bearings, cutting materials—such as tungsten carbide, tantalum carbide, etc.—shaping and grinding of cutter tips and piloted tools. Better understanding of operation and operating conditions has secured vastly improved efficiency in processing technique. As a result, boring operations now accomplish improved alignment, and accuracy for roundness and straightness within very low limits. Reaming continues in use by some manufacturers as an inexpensive rough sizing operation. Honing is used by practically all engine manufacturers to produce controlled final diameter size, accuracy for roundness and straightness within a few ten-thousandths of an inch, and to obtain any desired degree of controlled final surface finish. Recent new developments have extended the amount of stock removal which can be obtained economically by the honing process, together with other features of control which will be described in the following sections of this paper.

To obtain maximum efficiency and improved work, good tools and equipment deserve favorable conditions of application. Only balanced operating conditions can compensate for the generation of heat, deformation of metal structure, distortion, and other unfavorable factors which may, and all too frequently do, affect the accomplishment produced in the finished bores. In reviewing these operating conditions, mention should be made of some of the variables which contribute toward reduced mechanical efficiency in production processing.



A. Reamed.

C. Precision Bored.

B. Reamed, Mechanically Rough and Finish Honed.

D. Precision Bored, Hydraulically Finish Honed.

Fig. 1—Comparative structural disturbance resulting from typical machining processes.

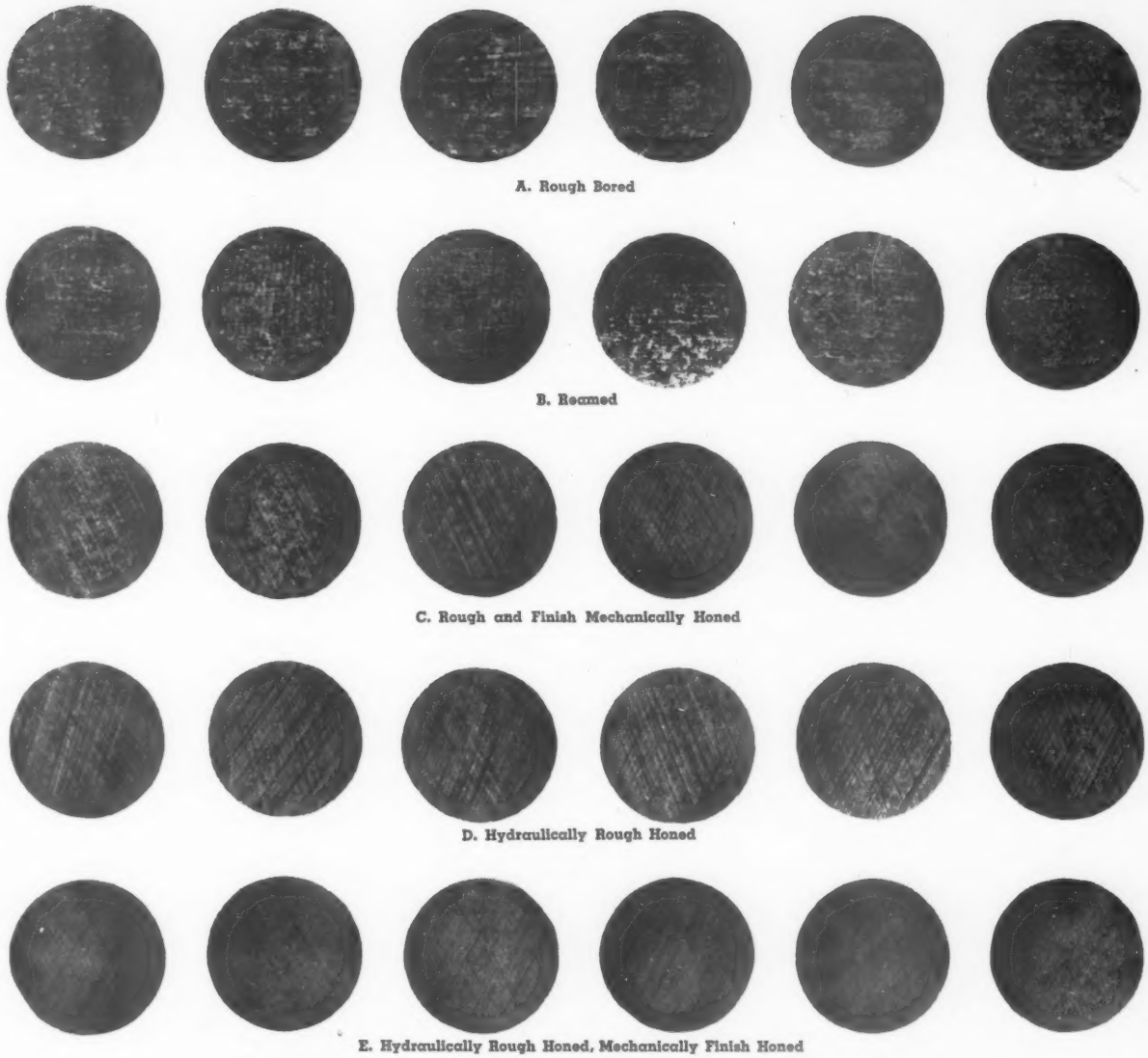
Foundry Practice

It is not unusual to hear production personnel say that its troubles start in the foundry. It is believed, however, that increasing attention is being given to control in foundry practice, within practical limits. The percentage of carefully sorted scrap which may be used, is being definitely regulated.

It is practically impossible to report an average iron analysis, or a range of analyses, as used in the industry. Cylinder block iron, in conventional practice, is reported generally to contain not more than 25% scrap, brinells somewhere in the range from 180 to 255, usually contains some chromium to harden the iron, some nickel to facilitate machining, and is commonly known as Ni-Chrome iron.

One large manufacturer has successfully developed a new high degree of accomplishment in foundry practice, comprising an elaborate series of electrical heat controls. In this plant, approximately ¾ of 1% copper is used, and the percentage of silicon kept at a minimum—or less than 1%. It is reported that this practice produces a desirable hardness and denser structure, which is favorable to machinability and operating wear.

Hardness and machinability of iron in present applications may be said to represent a practical compromise in rela-



A. Rough Bored

B. Reamed

C. Rough and Finish Mechanically Honed

D. Hydraulically Rough Honed

E. Hydraulically Rough Honed, Mechanically Finish Honed

Fig. 2—Variation in Surface Roughness produced in machining six-cylinder-in-line blocks.

tion to processing cost. However, the trend toward bores of harder surfaces is indicated in the present experimental development of induction hardening and its reported adoption in the industry.

Casting Technique

In the majority of all plants, the blocks are cast in wet sand molds, under atmospheric pressure, the metal being poured into the mold. One of the common objections to this method is, that occasionally as many as 40% defective castings are obtained due to core shifting, sand holes, etc. In some plants, the blocks-in-molds are passed by conveyor through an oven, or over a distance sufficient to accomplish this amount of cooling.

Probably the most difficult and interesting casting problem in the industry is exemplified by the V-type blocks now used by several manufacturers. With the former casting technique, the amount of rejects was exceedingly high, due to core shifting. Accordingly, a method was devised of using baked sand molds, or, for all practical purposes, a formed die, a truly remarkable accomplishment, in which standard limits were maintained within a few thousandths of an inch in making the molds. This, in turn, led to the development of a new casting technique, in which the molten iron is contained in huge hoppers, from which it is ejected into these baked sand molds under the head pressure formed by the contained molten metal. These combined developments are reported to have reduced the percentage of rejects from upwards of 50% to approximately 10% in production.

Design

Many machining and assembly variables are the result of block design. Error produced in machining by passage of a tool bit over supported and unsupported surfaces can in many cases be eliminated only by redesign of the block. It may be recalled that it was very quickly found possible to eliminate stud bosses anchored to cylinder bore walls after it was learned that the cylinder wall distorted when the cylinder head stud bolts were tightened down.[1] Substantial improvement in mechanical accomplishment has been effected by elimination of frews and similar supporting and tying members, skirted cylinder bores, and by providing full, uninterrupted jacketing of bores.

Siamese bores represent probably the most difficult cylinder bore machining problem, dependent upon a very fine balance between the cross-sectional, transverse thickness of the Siamese connection and the amount of material in the cylinder bore walls.

(Continued on next page)

1 "Surface and Shape Characteristics of Cylinder Bores" by Kirke W. Connor—Paper presented at the Tractor and Industrial Power Equipment Meeting of S.A.E.—S.A.E. Journal, March, 1935, pp. 95-111.

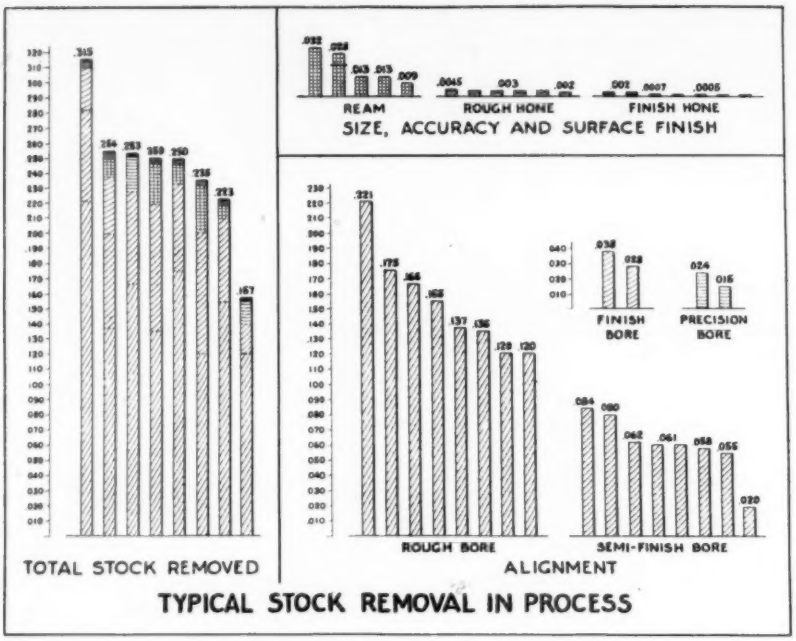


Figure 3

Machining Process

The machining of cylinder blocks represents a continuously changing set of conditions due to the relieving of strains which occurs with each operation in process. Localized high heat generated in process may also cause variable distortion and hard spots in the metal which affect the uniform machining of other parts of the block.

Probably the greatest cause of difficulty in machining accomplishment results from wholly or partially uncontrolled heat in the tools, the machines and the work. All tools heat up in high production usage. Even now it is frequently found in present installations that boring tools, when heated up, will expand to the extent that bores are as much as .001", and sometimes more, over the nominal size setting of the tool. Thus, in many plants, it is common practice constantly to juggle the tool setting sizes to maintain the required machining limits in succeeding operations.

The location of the hot wash must be favorable to securing and holding the maximum accomplishment of the combined processing operations. Accuracy generated under approximately 200° to 250° will not be maintained after the block has cooled.

The equalized burden of accomplishment per operation is of major importance in maintaining uniform mechanical results, and in minimizing the number of allowable selective fit sizes in cylinder bores. This is so important in the finishing operations that one manufacturer has provided an air-conditioned, temperature controlled room, in which the blocks, machines and tools are kept as near to 72° as possible in all operations beginning with final boring and including honing and gauging. For those who do not feel this capital investment to be in economic balance, it would seem to promise improved manufacturing efficiency to plan the process very carefully so that larger amounts of stock might be removed by the abrading process instead of the cutting processes. As related to cost of production line changes, if the number of operations can be reduced and at the same time keep the capital investment in machine tools at a minimum, due consideration should be given to new possibilities now available in the honing technique.

Gauging and inspection should be located to the best advantage. It has been repeatedly demonstrated that gauging while the block is heated leads to undersize bores in assembly.

Structural Deformation

Increasing attention is being given to the effects of processing operations, as related to deformation of metal structure. Many investigators have indicated that heavy cutting action or the application of high pressure, produces molecular and structural disturbances in the work metal. These disturbances may and frequently do persist throughout successive machining operations. Percussion and bearing forces definitely account for tearing and burnishing of the surface metal, and in the generation of high frictional heat.

Some very interesting and important work has been done by the Research Laboratories of the Cincinnati Milling Machine Company,[2] and by other investigators, during the past few years, which seems definitely to prove that a metal cutter tip does not maintain constant contact with the work metal at all times during operation. This research is the basis for the theory of the "built-up" edge in cutting operations, and serves to explain the snagging and tearing dislodgement of metal in present high production multiple point boring operations.

The compression forces introduced by reaming produce limited practical stock removal while contributing materially to the amount and extent of structural deformation. In this type of operation the metal is both torn and compressed, producing a surface with a "skin" of variably compressed metal. It has been found that, due to the crystalline structure of cast iron, these disturbed crystals are rapidly dislodged in service, and do not accomplish a "hardening" of the bore surface desired for operating service conditions.

Evidence substantiating this viewpoint is shown in Fig. 1. The typical condition of chatter and tearing, compressive action of reaming is shown in "A." In view "B," it is evidenced that deformed metal is still present following rough and finish honing operations, where mechanically actuated tools were used to remove approximately .0035" of stock from the reamed surface. In contrast to this, a single point precision bore surface is shown in "C," containing little or no visual evidence of structural disturbance. View "D" represents a precision bored surface which has been honed with hydraulically actuated honing tools, and with evident improvement in surface character.

Processing Variations

The variation which occurs in some production processing operations on multiple cylinder-in-line blocks is illustrated in Fig. 2. Each horizontal line shows six cylinders-in-line, taken from several production blocks which were cut open to show the average conditions obtained in regular production.

The typical percussion action obtained in rough boring, with the resultant tearing and snagging dislodgement of the metal, and the variations of tearing, burnishing, chatter, and similar unfavorable results produced in a reaming operation, are shown in lines "A" and "B."

In line "C," these reamed bores have been rough and finish honed with mechanically actuated honing tools, removing a total of .003" to .0035" stock on the diameter. It is apparent that the structural disturbances resulting from previous operations are still present after this final processing.

The manufacturer producing this six-cylinder block recently adopted hydraulically actuated honing tools for the rough honing operation, following reaming—with the result shown in line "D." Stock removal was increased to .0035" to .004" in this rough honing operation, and this slight increase of stock removal apparently cleaned up a major part of the structural deformation previously

(Continued on page 37)

[2] "Metal Cutting: The Formation and Function of the 'Built-Up' Edge" by Hans Ernst and M. Martelotti, Research Laboratory, Cincinnati Milling Machine Company—Paper presented at Annual Meeting of A.S.M.E., 1934—"Mechanical Engineering," August, 1935, pp. 487-498.

The Engineering and Fabrication of Draw Dies

By JAY BOWEN
DIE EDITOR, A.S.T.E. EDITORIAL COMMITTEE

Most articles in technical and trade journals seem to gain the interest and attention of only those who specialize in the particular branch of industry covered by the article. These articles would be of more general interest, if along with the technical data there were injected some of the human interest and local color associated with their lines. I am sure that, in my own line, there is as much color, action, excitement and, if you will, romance, as there would be in sailing the seas, railroading, construction or flying.

I recall seeing stories in "The Saturday Evening Post" illustrated with stamping plant backgrounds—or at any rate the artist's conception of them—which leads me to believe the authors had the same idea. In the following discourse there may be many exceptions to the statements I make so they are not offered as a set of rules.

Importance of Pattern

An automobile is designed by an engineering staff consisting of two main branches; namely, chassis and body division, which perform their duties far in advance of a tool program. Most body engineering departments co-operate to the utmost with the die end of the business to the end that a die man is in constant consultation with them so that the parts are designed in keeping with possibilities of manufacture, that is, depth of draw, minimum of finishing, number of operations, possibilities of breakage, excess stretch causing the surface of the metal to pit, etc.

When a panel is finally agreed upon and a wood model completed by a special model department, generally supervised and subject to the body engineering department, it is then turned over to the die division for the production of dies.

In most cases a die drawing or design is made, but—and this is a very large "but"—the actual design of the die takes place during the course of construction of the patterns.

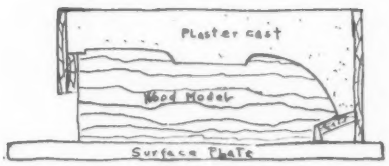


Figure 1—First step in constructing patterns for draw die—making plaster pad.

The die drawing often furnishes little more than the outward confines of the die, shut heights, thickness of castings at various points and, perhaps, dimensions or instructions. The model and the die drawing are turned over to the pattern department where a model setup is made under close supervision of the die department executives. At this point, it is well to say that every pattern shop in which patterns are fabricated for body and chassis punch draw dies, has its quota of pattern makers whose knowledge of blankholder lines and surfaces is not to be taken lightly.They are quite capable of carrying this work forward, on their own initiative, to the point of final approval by some seasoned old veteran of many battles in pressroom, die shop and tryout, whose actual contact and experience with all sorts of conditions of "draws" tells him at almost a glance whether the ring line is too high or low at this point or that; whether it is too near or too far from punch when at bottom of stroke, and many other kinks too numerous to mention.

The type of man I have in mind was the late James Vehko of The Murray Corporation, whose compeer—or nearly so—is to be found in every large die producing organization.

The Model

Getting back to the model setup; once this is determined a female plaster cast is made from the model at proper distance from surface plate corresponding to bottom of die. The plaster is then trimmed to proper plan-lines so that pattern for lower blankholder can be built around it with correct die opening. The die line or draw edge is worked on the pattern approximately in wood, the pattern being raised 2 or 3 inches from surface plate to allow

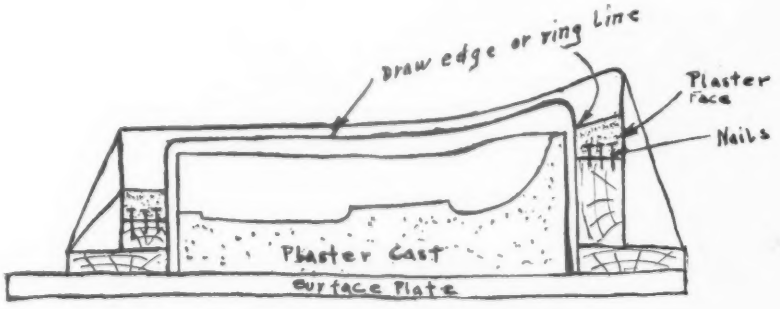


Figure 2—Construction of lower blank holder.

for plaster face to be added, which will be the correct and finished surface from which a grind and file finish surface is produced on the casting.

The lower blankholder pattern complete, the upper is built parallel to it, allowing necessary space between the two to allow a plaster face to be cast on it, from the lower. The blankholder patterns are then complete with exception of finish and guide strips on inside, and heels on outside to insure proper alignment, the blankholder surfaces in most cases being angular to base, which would cause them to skid on each other unless properly heeled. In most cases guide pin bosses or locks are also applied.

A wood pattern with plaster cast face is made for the punch from the original female plaster cast which, in many cases, is used to make pattern for lift-out-pad or forming pad if such be required. The only instance where pads are necessary is where the draw is too deep to be pried or lifted out or a reverse condition exists in panel making it necessary to push metal into punch.

The Castings

The next step is the making of the castings, which is a job for the best molders obtainable who are especially experienced in this work, the castings being of the dry sand or baked mold variety.

Blankholder faces are usually ground and filed to fit each other from the rough casting instead of first machining them, and are considered by most authorities to be the best, preserving as much as possible the outer skin or surface of casting and not getting into the softer, grainier metal underneath. This gives a superior working or drawing surface.

The face of the punch is usually machined on an automatic contouring machine or horizontal boring mill equipped with such attachment, reproducing the surfaces of the model to the extent that, with slight effort, cutter marks are easily ground and filed away leaving a very accurate reproduction in metal of the wood model.

The pad or female—if such be required—is then spotted to the punch either from a clay sand or file finish casting or from contour milled surface same as the punch. Before these machines were perfected this work was accomplished by hand fitting processes using spotting frames or skeletons to reproduce model.

The last procedure, before releasing die to the tryout department, is to place assembled blankholders on the planer or mill and take light cut over top surface of upper blankholder to insure their being parallel or square. The assembled punch and pad undergo the same procedure. The tryout department then sets out to get die in running condition and make stampings.

Effect of Design and Construction

Most of the time these dies reflect the good judgment of the men who supervise the design and construction, but once in a great while a lemon is produced which is a headache all thru the production of a years model. But the boys never give up trying to effect a cure and about the time the next model is to be built, the breakage or scrap and finishing have been reduced to a minimum. Then it is discarded or sent to service storage and the battle starts anew, but everybody loves it, wouldn't swap jobs with anybody and many tales are told and retold when the boys get a breathing spell and get together.

"Now back in '28'—or—was it '29'? —a certain fender or quarter panel baffled all the experts and master minds for miles around. Being well into a year's production with scrap and finishing aplenty, some greaseball sez to the 'old man' who was standing with his hands on his hips woefully regarding the operation of same, about every other one being scrap, and looking forward to the next letter from the high command, that this condition must cease to exist if any dividend was to be declared at the end of quarter or words 'if not music' to . that effect 'Why,' sez he, 'don't we do so and so to this blankety blank so and so?' (Diemakers can use their own words.) So we yanked it out of the press at the end of the days run and took it to the tool room—not that I had any faith in the suggestion but being desperate—and—do you know it went back in the press and, wonder of wonders, panels came forth such as we had never hoped for and I bet the same !?x? idea wouldn't work again on any other sort of a panel except an exact duplicate."

Such is the life of the die executive who is responsible for the workability of body panel draw dies, but it is like railroading, sailing or gold prospecting; it gets in the blood and do they like it? Not much!

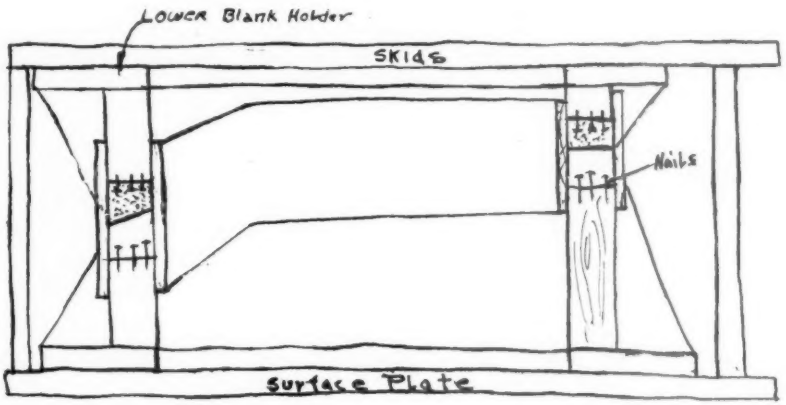


Figure 3—Showing setup to pour plaster face on upper blank holder.

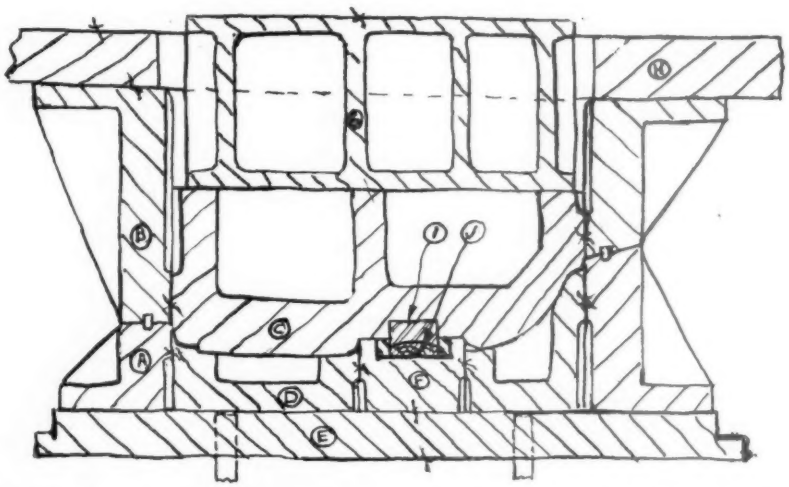


Figure 4—Showing complete draw die, (A) lower blank holder, (B) upper blank holder, (C) punch, (D) pad, (E) base plate, (F) window punch, (G) punch extension, (H) blank holder plate, (I) relief punch or biscuit cutter, (J) rubber to eject scrap.

DO VENDERS HAVE COMPLETE INFORMATION TO QUOTE ON YOUR EQUIPMENT NEEDS?

By FRANK J. RUPPEL
CHRYSLER CORPORATION—DODGE DIVISION

The idea presented here has been designed to eliminate the possibility of the Vender receiving insufficient information for quoting purposes.

In the past, time after time upon completion of quotations we have discovered to our dismay that the proposals differed so greatly that we were unable to make the necessary comparison to arrive at the logical equipment for the operation and deemed it necessary to request revised propositions.

Consequently, we drafted a form for filling in all the required data, and in so doing, each Vender obtains the same story relative to production required, how the part should be located, our choice of clamping, previous operations, etc.

Results from the use of this form have been most gratifying; it has simplified matters in our Methods Department and more unified quotations have resulted from our suppliers and they, too, have found the form to be an asset in every respect.

Date.....

DODGE MAIN PLANT—DIV. OF CHRYSLER CORP.

To.....

PLEASE FURNISH QUOTATION FOR THE FOLLOWING,—

Part No. & Name.....
Operation .....
.....
Net Pieces per Hour Req'd.....
Type of Equipment Preferred.....
.....
Condition of Part.....
Amount of Stock to be Removed.....
Locating & Clamping Spots Preferred.....
.....
Finish Req'd .....
Delivery Date .....
Remarks

DODGE MAIN PLANT—DIV. OF CHRYSLER CORP.

To All Equipment Venders: Please follow this form when quoting on equipment. All quotations to be made out to the attention of Master Mechanic. Number all quotations. Tell Part No. & Part Name. Describe operation to be Performed. Name the size & type of machine proposed with description of operation and method. Also describe operation of fixture & method of locating & clamping. Make time study of operation & production per hour @ 100% efficiency.

Quote On Equipment As Follows:

Size, Type and Name of Machine..... Base Machine Price
Special Attachments (Includes Flange Quills, Raise Blocks, Coolant system etc.) ..... Each Price
Special Heads, Mult. Heads etc. ..... Each Price
Fixtures, Work Arbors, Holding Devices etc..... Each Price
Tool Holders, Tool Blocks, Cutter Arbors, Bars etc..... Each Price
Special Tools, Inserts, Cutters etc..... Each Price
Motors (To be fully enclosed, fan cooled, Ball Bearing Type)..... Price
Starters (Comb. Starter & Disconnect & Transformer Control)..... Price
Push Button ..... Price
Mounting Electrical Equipment ..... Price

NOTE: Vender to contact Dodge Electrical Dept. for Electrical Specifications. All special Tools and Fixtures to be drawn on Chrysler Drawing Paper.

6-10-38

The above forms are presented to readers of "The Tool Engineer" through the courtesy of the Chrysler Corporation. As Mr. Ruppel points out, time after time, quotations are received only to find that proposals differed so widely that it was impossible to make necessary comparisons. Perhaps these forms will be found useful in your plant.

PRODUCTION PERSPECTIVES

NEWS OF MASS MANUFACTURING FROM EVERYWHERE

Midwest

Despite a falling off in factory employment in Rock Island, Illinois district, figures from a survey completed July 14 among 74 plants showed that **in the last week of June this year there was total employment of 18,548 men—only 142 less than the 18,690 employed at the peak of production in 1929, which was considered a boom year. Indications are that the recession in this area will be less severe than was indicated two months ago, and will be of brief duration. Peak factory employment in the tri-cities (Rock Island, Davenport, Moline) was 26,330, registered in September of last year.** The survey includes 90 per cent of all factories operating in the area, and are the latest complete ones available. The figures do not include office or supervisory personnel, which show little variation. **In Rock Island the Farmall Works** of the International Harvester company **was closed down during July,** all employes taking vacations this month. However, a number of men, including patternmakers in the experimental department, are being called back to work, according to reliable information. On **August 1, the plant resumed production with 1,800 men at work, the same number employed as of June 30. A combination of competitive conditions, a drop in business and removal of the truck motor manufacturing unit to Indianapolis was responsible for the large reduction** in the force at the Farmall works. International Harvester is said to have been forced by competitive conditions to manufacture the F-14 tractor which had an adverse effect on sales of the principal Farmall model made at the Rock Island works. The F-14 is made at a Chicago plant. The company is expected to **manufacture newly designed tractors,** probably three models, at the Farmall works, and restore employment to a considerable extent by fall. Various factories of **Deere & Co. are recalling men** who have been out of work temporarily. The **manufacture of the garden tractor** at the old Velie works is expected **to provide a substantial increase.** This tractor has met with considerable favor because of its adaptability for a variety of jobs. Harvesting machinery factories of both **Deere & Co. and International Harvester company in East Moline** have maintained a high level of production since the first of the year. Some seasonal decline in operations is expected, however. Improvement in other lines of business, evident during the last few weeks, and good crop prospects have resulted in a generally optimistic feeling among the implement manufacturers. A **further stimulus to optimism** during recent weeks were **reports of normal employment at the Servus Rubber company, steady production at the J. I. Case company's Rock Island works,** and prospects for a **record peacetime year of manufacturing** starting this fall **at Rock Island arsenal.**

CARL G. DAHLQUIST

We announce, with deep regret, the untimely demise of Mr. Carl G. Dahlquist, who died June 25th after an illness of several months. Mr. Dahlquist was popular among Tool Engineers, was thoroughly schooled, having worked up from the ranks. After an apprenticeship as toolmaker at Noiseless Typewriter Company, Bridgeport, Conn., he became connected as journeyman with Pratt & Whitney of Hartford, then, coming to Detroit twenty-five years ago, took work as toolmaker and tool designer in local shops. These included F. Jos. Lamb Company, H. L. W. Sales Company, Arrow Tool & Reamer, Ternstedt Mfg. Co., Cadillac and Graham-Paige Motors among others. He left Graham-Paige to become salesman for the Geo. A. Gloor Company, remaining with them fourteen years, until joining the Swartz organization in '33.

But 43 at the time of his death, Mr. Dahlquist is survived by his widow, Sue A., and close relatives in his native Bridgeport.

The Anderson Engine and Foundry Company plants, at Anderson, Indiana, have been **purchased by Michael Tauber & Company, of Chicago.** A representative of the Chicago firm gave out the statement that the company would attempt to keep the factory operating for the time being.

The International **Harvester Company's West Pullman and Tractor Works** in **Chicago** were **closed during the last two weeks of July. A part of the McCormick works** was **closed the entire month,** and a part for the last half of the month, while other parts continued operation throughout the entire month. **Tractor and farm implement works in seven other cities** were **closed for the entire month, namely, Auburn, N. Y.; Richmond, Ind.; Canton, Ill.; Rock Falls, Ill.; Chattanooga, Tenn.; Milwaukee, and Rock Island.** Two truck plants operated on a reduced schedule during July, and two twine mills were placed on a four-day week.

As an evidence of "Good will toward men" the **W. A. Sheaffer Pen Company,** of **Fort Madison, Iowa, is giving all employees a paid vacation bonus of 7½ per cent** of their salaries for the six months ended June 1. The company also announces that it now has more people on its payrolls than in the peak year of 1929. Sheaffer employees received last December a year-end bonus of 10 per cent of a half-year's salary.

Because of high taxes, Milwaukee is **to lose** one of its **large manufactories,** the **National Enamelling and Stamping Company,** established since 1899. **Production is to be transferred to the company's other plants,** unless better cooperation can be had with its Milwaukee employees. Higher taxes are said to be one of the disadvantages of production in Milwaukee. **This company is the latest of more than 30 factories either to abandon Milwaukee or to expand in other communities** during the last few years. The National Enamelling and Stamping Company has plants also at Baltimore, Md.; Granite City, Ill.; and Laurel Hill, Long Island, N. Y. By better co-operation was meant larger individual productivity.

All **tangible assets** of the **Pacific Conditionaire Manufacturing Company,** Inc. (bankrupt) **have been offered at auction.** The plant is located at 4223-45 West Lake Street, Chicago. **Besides portable units, parts, motors, testing laboratory equipment, office furniture, dies, jigs, patents,** and customer lists, the right to use "successors to" and the name, **is being offered.**

There are some **indications of industrial improvement in Ohio.** Encouraging signs in this area include a **decrease of 5,900 jobless in June** in Cuyahoga County (Greater Cleveland), first decrease in the county since last December. This was only 3 per cent but it confirmed other employment reports which indicated a **cessation of the downward movement. Toledo Auto Parts** plants **recalled 3,000 workers** the week of July 10-16. **Youngstown Steel Door Co.** has started work on 3,450

doors for the **Southern Railway** recalling a moderate number of employees to turn out the work. More than 80,000 tons of finished steel products are being distributed for Southern's car order which totals 5,500. **White Motor Co.,** Cleveland, following its vacation shutdown the first week of July, has **resumed operations** on a five-day week with a moderate force. Prior to the vacation the company was working three and four days a week. **President Robert F. Black** says the **impetus was brought about by orders from the east** and from present indications the longer working week will be maintained through August. White has improved its financial position considerably this year and is now free of bank loans. Inventories have been reduced by $2,000,000 and $1,800,000 in loans paid to banks.

Monarch Machine Tool Co. of Sidney, O., on July 11 reported net income for the first half year ending June 30 at $157,991, after depreciation and provision for taxes. **Earnings were equal to $1.05 per share** and compared to $1.22 per share earned in the same period of 1937. At the same time a **substantial backlog of orders,** insuring near capacity of operation for many weeks, **was reported on hand by W. E. Whipp, president.**

Albert A. Geck, vice-president of the Breckinridge Machine Co. and a **leader in the manufacture of machines** which have made Cleveland a world center for this industry, **died July 18** at his home in Cleveland Heights, Cleveland suburb. **Mr. Geck,** who spent his life in the machinery manufacturing business, **was born in Detroit** and after boyhood in Denver and Toledo became an apprentice in the Baker Bros. Co. plant in Toledo. From his apprenticeship he rose to the post of superintendent of the plant and left the company to become **general manager of the Colburn Machine Tool Co. in Franklin.** He came to Cleveland when that company moved here. In Cleveland he **became associated with the Breckenridge concern as its vice president.**

Harry A. Duffy, for years Purchasing Agent for the Ford Motor Company at the Highland Park plant, and **recently Purchasing Agent for the Michigan Tool Company, died** suddenly at his home Wednesday, June 29. **Well known in automotive and industrial circles,** Mr. Duffy, born in Springfield, Ohio, spent virtually his entire life in Detroit. He had suffered an attack last winter, but apparently had been gaining in health in recent months, and had resumed his business activities.

G. W. Garn, formerly at the Fuller Manufacturing Company, Kalamazoo, Michigan, is now **superintendent at the Unit Drop Forge Division, Milwaukee. The International Harvester Company has transferred George H. Hendricks,** formerly assistant foreman in the heat treating department at the Tractor Works, **to its East Moline (Illinois) works, where he is now plant metallurgist. Paul M. Steiert,** formerly with the Detroit Twist Drill Company, **has been made chief metallurgist of the Chicago-Latrobe Twist Drill Works.** From the Delco Products Corporation **S. K. Oliver has gone to the Electro-Motive Corporation, La Grange, Illinois,** where he is in charge of heat treating in the new Diesel engine plant. The 55-year-old **Hamilton-Brown Shoe Company, St. Louis,** has been **sold to the Collins-Morris Shoe Company,** a St. Louis syndicate. A statement given out by W. L. Collins, president of the syndicate, gives the amount paid as about $500,000. **The Chicago branch of the Bienenfeld Glass Works, Inc.** is **soon to occupy its own building.** The company has **purchased a former warehouse** located at 1525 West 35th Street for $75,000 and **will remodel the building** at a cost of $25,000 or $35,000 **for its own use.** It is a one-story structure 135 by 600 ft. The Chicago branch now rents a building at 3639 South Ashland Avenue, only a block or two from the building they are soon to occupy.

New order index of National Machine Tool Builders' Association advanced to 70.2 in June from **66.7 in May and 191.8 in June, 1937.** Index of domestic orders advanced to 35.7 from 34.8 in May and 137.6 in June, 1937, while foreign index was 34.5 in June vs. 31.9 in May and 54.2 in June, 1937. Foreign orders accounted for 49 per cent of June business vs. 48 per cent in May.

Among the members of A.S.T.E. are specialists as Jig and Fixture designers, Die designers, Gauge designers, Time Study men, Plant Engineers, Master Mechanics, etc., **with several individuals representing each line in every chapter.** An **unusual specialist** is ASTEer Harry Satterthwaithe, **who is providing a Hole Engineering Service.** This service is reaching out not only well **throughout this country but in many foreign districts** also, having been solicited for recommendations concerning holes .028" in diameter; 3/32" x 8" deep; 3/16" x 24" deep; 16" diameter x 4" deep and many others with tolerances of .0001" to .0003" for size round and straight. At first thought it seems a limited field but comparatively few parts are made which do not contain one or more holes with requirements for quality being continually improved.

April sales of the air-conditioning industry were the **best** for any month since July, 1937, the **Air-Conditioning Manufacturers' Association reported June 21. April cost of installed equipment was $7,080,664 compared with $5,419,116 in March,** an increase of 30.66 per cent. The four-month total was $19,525,466 compared with $14,756,992 in the corresponding period of 1937. "Monthly figures have been on the upgrade since last December," **William B. Henderson,** executive vice president, said.

St. Louis-San Francisco Railway, effective July 1, **re-employed 165 men** in its coach shops after a layoff of several months because of, according to F. G. Lister, plant superintendent, at Springfield, Missouri, "a little pickup in business."

A **guaranteed wage and a profit-sharing for employees** of the new **Owosso Parts Co., Owosso, Mich.,** will be given a **trial** when the plant begins operations within the next few weeks, a spokesman for **Ralph Redmond,** president, said. The new firm will **succeed the A. G. Redmond Co. of Flint,** which will discontinue its plant after 13 years of manufacturing automobile parts and accessories. **A. G. Redmond will become an officer** in the Owosso plant operated by his brother. In an **attempt to promote better employer-employee relations and industrial peace,** the new firm has **drafted a tentative plan** calling for: **a guaranteed wage** with future plans calling for a guaranteed annual wage if the company prospers. **A profit-sharing plan** with **employees receiving up to 30 per cent of their wages.** Twenty per cent will be paid before dividends are declared for stockholders, and 10 per cent will be paid employees on an equal basis with stockholders' dividends. **Westinghouse Electric & Manufacturing Co.,** East Pittsburgh, on July 13 was **awarded a contract for $1,700,000** to build electric equipment for 10 new 100-mile-per-hour locomotives for passenger service on the electrified section of the Pennsylvania Railroad between Harrisburg, New York and Washington.

A profit-sharing plan to become effective July 31 is **included in an agreement** reached June 30 **between the Federal Machine & Welder Co., Warren, Ohio, and the United Radio and Electrical Workers' Union.** Settlement of a dispute over a wage cut was aided by Arthur L. Faulkner, U. S. commissioner of conciliation. The agreement continues wage rates, seniority, vacation and grievance procedure including arbitration, it was reported.

St. Louis Southwestern Railway reopened its **division locomotive shops at Pine Bluff, Ark. about July 1** giving employment to 220 persons, it has been announced. The shops had been closed since Feb. 1.

The Caterpillar Tractor Co., Peoria, Illinois, has reduced the prices of its tractors $150 to as much as $650 and prices on its Diesel engines were reduced $175 to as much as $750. **All** of the company's **tractors and Diesel engines** were **included** in the mark down. The cut was made, according to a recent announcement, with a view to stimulating business and providing steady or additional employment for the company's 8000 workers.

The New York Wire Cloth Company, York, Pa., resumed full operations of both their plants in York, **according to an announcement made by Robert P. Turner,** vice president and manager. The plants had been closed for several weeks.

East

The Blackstone Manufacturing Company, Inc., a division of the Jamestown

(N. Y.) Metal Equipment Company and for many years one of Jamestown's prominent industries, has **recently entered the vacuum cleaner field.**

James H. Rand, Jr., chairman of the board and president of **Remington Rand, Inc.,** said July 12 his company was **clearing its record with the National Labor Relations Board** that week and proclaimed a new era of co-operation between the 8,000 Remington Rand employees and himself. Addressing the company stockholders, Rand said all participants in the Remington Rand strikes two years ago who have sought reinstatement under a labor board ruling would be working again in the various plants by July 15. He asserted the great majority already had resumed work.

Henry Ford, it is reported from Washington, D. C., **has patented a new type of passenger automobile with motor mounted over, and parallel to, the rear axle, and with a direct drive from motor flywheel through gears to the axle.**

George K. Throckmorton, president of the R. C. A. Manufacturing Company, Camden, N. J., announced July 6 more than 1,200 new employees were added to the normal employment of 8,500 last month. Throckmorton said the **increase** was **due to** the great gain in **orders** over recent years.

The Directors of the **Simonds Saw and Steel Co.** have decided to proceed at once to move into its new **windowless plant at Fitchburg, Mass.** The company built this plant in 1931 but did not attempt to move into it then on account of severe business depression.

The new plant will be the **largest and most modern saw and knife plant in the world** and will contain the main Fitchburg saw and knife plant, the Fitchburg file and hack saw plant, and also the Chicago plant where band saws and crosscut saws are manufactured.

The **Windsor Automatic Company, Inc.,** Windsor, Vermont, has been **acquired** by the **Billings & Spencer Company** of Hartford, Connecticut. The business has been **moved to Hartford** and will continue to be operated as a division of the Billings & Spencer Company. An **interesting coincident** in connection with this acquisition by Billings & Spencer of the Windsor Automatic Co. **is that the Billings & Spencer Company was founded by Mr. Charles E. Billings,** formerly of the Robbins & Lawrence Shop in Windsor, Vermont, **and Christopher M. Spencer, who designed the Spencer rifle** which was used in the Civil War and **who invented the first automatic screw** in 1873.

A brighter business horizon is **evidenced by an order of the Consolidated Edison Company of New York for 25,000 electric irons from the Westinghouse Electric & Manufacturing Company, Mansfield, Ohio.** This order, the largest single iron order the company has received during the past four years, will be used in the Consolidated Edison Company's fall business activity.

Reports from widely scattered industries throughout Connecticut indicate **a definite pick-up in orders resulting in increased employment. New Haven Clock Co., New Haven, has re-hired** a "substantial" number of employees laid off in recent months, **according to Richard H. Whitehead, president and general manager. Waterbury Clock Co.,** Waterbury, **reopened July 11** after a week's vacation period **with 200 more employees than on the date of the shutdown.** The company is experimenting with an electric shaver and has formed a subsidiary, Waterbury Electric Shaver Co., to produce it. **Addressing the sales force of General Shaver Corp., at Bridgeport, recently, President James H. Rand, Jr., of Remington-Rand, Inc., predicted a strong improvement during the next few months** and added that by fall retail sales will reach a higher point than that of 1937. It was announced that General Shaver Corp. is taking 20,000 square feet of additional floor space at its Bridgeport plant. **New Departure Division of General Motors Corp.,** with plants in Bristol and Meriden, **reports a considerably brighter outlook.** The Meriden plant has stepped up its schedule from 24 hours a week to 32 hours, and has added men to the payroll. **Union Hardware Co., Torrington,** has put the greater part of its plant on a 40-hour schedule, while other Torrington factories continue operations on 24 and 32 hours. Although unable to give paid vacations this year, **E. Ingraham Co., Bristol, clock manufacturer,** increased working schedules before and after the annual inventory shutdown to give employees the equivalent in time of an extra week. **Scovill Mfg. Co.,** Waterbury, has resumed operations after the annual two weeks' shutdown. **Trumbull Electric Mfg. Co.,** Plainville, reopened July 18, after having been closed one week for general repairs. **International Silver Co., Meriden,** has closed Factory P, Wallingford, and consolidated its operations with Factory L, Wallingford. Factory P produced flat and hollow ware and has been operated by International since 1890. **American Brass Co., Waterbury,** is **building a sheet copper rolling mill** at its Liberty Street plant, to be 180 x 153 feet and to cost about $50,000. **Clifford I. Packer, Packer Machine Co., Meriden,** has been **elected secretary pro tem** of the **Meriden branch,** Smaller Business Men of New England Association. **Milton P. Sarfaty has resigned** as superintendent of the Eagle Lock Co., Terryville. **Philip Atwood and Henry G. Hutchinson** have been named superintendents of the lock and screw departments, respectively. **Edward Otis Goss, president of Scoville Mfg. Co.,** Waterbury, since 1920, and connected with the company 50 years, died July 4, aged 72.

Asinof & Sons Manufacturing Company of Chicopee, which recently opened after being practically closed for two months, is employing about 400 workers now, with a peak of about 500 expected this month.

Van Norman Machine Tool Co., Springfield, has started construction of a new building 140 x 51 of steel and brick to house the **Producto Machine Co. of Bridgeport, Conn., recently purchased by Van Norman.**

Thomas J. Coonan, foreman, Crompton & Knowles Loom Works, Worcester, has established a record which the company proudly hails in its latest issue of C. & K. Photo News. Mr. Coonan has been employed by the company for 67 years and has never lost any time as a result of accidents. **A skilled machinist** in the company's tool room, **Mr. Coonan entered the employ of the old Knowles Loom Works in 1871.**

Allistair R. Tulloch, secretary of the Western Massachusetts branch of the National Metal Trades Association, **has rounded out 20 years' service** in that position. He also is secretary and treasurer of the Employers' Association of Western Massachusetts.

John J. Duggan, president and general manager of the Chapman Valve Manufacturing Company, Springfield, was **host to the Chapman Valve Supervisors' Association at his home.** More than 80 members and guests attended and a dinner was served on the lawn. **Edwin A. Carter, chairman of the board of directors, was guest of honor.**

THE WINNAH!

'Andy," sez Roy, "be sure and write something about winning the Sweepstakes. I announced it as something unusual and I don't want to be let down in the middle." Wel, then here's the way of it: I bought the ticket from a frriend ou o' worrk, laid it away and forgot it. Came a wire from Ireland, which worried me wife who knew nothing of me gamblin' and so thought it must be someone dead in the Auld Sod only us having no relations there. But I explained it all satisfactory (and howl), hunted for the ticket and found it—glory be! Also, found meself in a state of transient fame, everybody wanting to look at a winner (including meself) which isn't so odd considerin' it's a some millions to one shot.

It's real pleased I am, although I haven't got the money as yet, but me friend who sold me the ticket (he's an A.S.T.Eer too, bless him!) got 125 bucks bonus so here's hoping. Anyway, it was lots o' fun, exceptin' the kibitzers (Ford Lamb among 'em) telling me what I'll have left when Uncle Sam takes his cut. I should worry.

Yrs. Truly
Handy Andy
Alias "The Terrible Swede"

Members Please Note

Dave Forsman, technical editor on the A.S.T.E. editorial committee, requests all readers to indicate their preference for editorial articles, especially along the technical lines. Perhaps you have an article that you would like to submit—if so, the committee will be glad to receive it to review for possible use in the columns of this journal.

Chapter Doings

Toledo chapter Tool Engineers went to town with their last meeting of the season—June 28. **In the absence of Chairman August Ehrhardt, Vice-Chairman Arthur Bok presiding,** introduced Dean Palmer of the University of Toledo. Dean Palmer presented the speaker of the evening, **Professor Zarobsky, who gave a very fine talk on Tool Engineering,** which he **illustrated with sketches drawn on the blackboard.** After his talk a discussion followed which was participated in by most of those present. **Rochester** had its June meeting at the plant of the Bausch & Lomb Optical Company in Rochester, **Chairman John S. Bartek presiding.** A short business meeting preceded the **feature** part of the program which **included** a paper by **Fred J. Loomis** of Bausch & Lomb **on "Optical Projection in the Shop"** with a question-and-answer session following. **Milton L. Roessel,** Rochester Chapter Secretary, **reports** there will be **no** further **meetings until September.**

Syracuse chapter held its June meeting at the Industrial Club on the 29th. Some fifty members were present with **Chairman A. H. Mitchell presiding. A vote of thanks was extended to** the following men who were responsible for the organization meeting of this chapter: **J. F. Owens, T. R. Adams, Carl Reasel, R. M. Carter, W. L. MacRae, R. C. Neal, A. M. Johnson. It was decided** at this, the second meeting of the chapter, **to hold the monthly meetings on the second Wednesday following the first Monday** of each month. **A clambake is also planned by Syracuse chapter September 10th**—the chapter's entertainment committee is making the arrangements now. **Chicago chapter, Clinton Ives, Chairman,** presiding, **continued its excellent innovation of having members make short talks before the feature part of the program** begins. This was on the evening of June 13th with Chicago **A.S.T.Eer Gallant** the first to take the floor. **He talked about the Machine and Tool Progress Exhibition** which was sponsored by A.S.T.E. in Detroit last March 9 to 12 and which Mr. Gallant had attended. Mr. Gallant gave an excellent resume of his reactions to the show and the points of interest. **Mr. Fruehauff of Chicago chapter** was second speaker and **commented on plans for the next Show.** Chairman Ives calling for **volunteers to work on a convention committee,** had favorable response from Chicago A.S.T.Eers **Hein, Doty, Lune, Weise, Pierce, Cole, Graven, Heppner, Zix, Schmidt, Polhemus, Ives, Fruehauff, Smith, Kazimier, Gallant, Bautz, Wingert, Kooyman, and Kincate. Mr. Finkl, of Finkl and Sons,** manufacturers of die blocks used on forgings, was the **main speaker** of this meeting, presenting a paper on the **use of die steels and the numbering system used on various steels.** Following the talk by Mr. Finkl moving pictures were shown which showed how die blocks were made. This was followed by the usual question-and-answer period.

Under a date line of July 12th come reports from **Baltimore Chapter** publicity chairman, **Leslie McGregor,** as follows: "Although we of the A.S.T.E. in Baltimore have suspended our regular Chapter Meetings for the summer months, we are far from being inactive. Our officers are utilizing this period in the formation of plans for the coming fall and spring.

"At one of our special meetings in July, **many constructive ideas** were **proposed.** For example, it was discussed whether or not we should inaugurate a series of short talks by our own members. **By this plan a different member would be delegated to talk at each of our Chapter Meetings,** his talk to precede our regular technical address.

"The opinion was voiced that this plan would afford a means of exchanging ideas. **After all, the diffusion of knowledge is one of our basic principles.** We also discussed the selection of a permanent meeting place. Last month we had a hand in successfully selling A.S.T.E. to a neighboring town. **Three of our members visited York,** Pennsylvania, on their invitation, to answer questions, and satisfy their curiosity regarding the Society. **Two weeks later, we were present at the birth of Chapter 22 in the ancient and honorable town of York, Pennsylvania.** Now that we have an A.S.T.E. neighbor only 40 miles distant, I am sure we can work together to our mutual advantage; **which brings me to the observation, my friends, that the expansion of this "American Society of Tool Engineers" is as certain and sure as has been the expansion of knowledge itself, since the beginning of time."**

Bridgeport chapter reports many of its **"boys" away on vacation** and no further meetings until fall. **Says H. J. DeAngelis, Bridgeport Chapter Secretary, "These Tool Engineers must have their mental and physical relaxation. This moment of suspended animation in business (recession) has given many of the plants in Bridgeport a chance to retool and develop new products so that when the Tool Engineer is again in harness production will reach a new peak." Cleveland chapter's last meeting** was held at Guild Hall with **Chairman Peter F. Rossbach presiding.** He introduced **Francis D. Bowman of the Carborundum Company, who spoke on the history and uses of abrasives**—a talk illustrated with slides, similar to other talks given by Mr. Bowman before other chapters of the Society. We hear that on June 10th **E. W. Dickett, Chairman of Rockford Chapter,** and **W. B. McClellan** left Rockford in Mr. McClellan's car at 1:40 p.m. bound for the **Stag meeting held by the Racine chapter at Racine, Wis.** The report comes to us that at 3:30 the same afternoon those same two gentlemen were busily playing golf at the above-mentioned Stag. They even claim they had time to steady their nerves before they began to play.

However, they say they had a wonderful time at the Stag which was really to be expected since we have heard before now about the fine hosts those Racine boys have proven themselves to be.

Says Jess Early, **Rockford Chapter** Publicity Chairman of the Rockford **Stag Party** which was held June 18th, "The Golf Tournament and Rifle Match, the two main events of the afternoon, got under way at shortly after 1:00 p.m. **at**

(Continued on page 32)

SPECIAL NOTICES

New York-New Jersey Chapter
Golf Tournament and Stag Outing
Pennbrook Golf Club
Basking Ridge, New Jersey
September 24, 1938
Golf, Horseshoe Pitching, Soft Ball, and other sports
Prizes for all events

	Charges Members	Guests
All day golf, lunch, and dinner	$3.50	$4.00
Afternoon golf and dinner	3.00	3.50
Dinner and other sports	1.50	2.00

Procure tickets from Thos. P. Orchard, 185 E. 33rd Street, Paterson, N. J.

Chicago Chapter
Harrison's Air-Conditioned Restaurant (first floor)
80 E. Jackson Boulevard, Chicago
September 12, 1938
Dinner: 6:45 p.m., $1.25 per plate (lecture only, $0.25)
Speaker: Richard K'Burg.
Subject: Hardening of Steel by Use of Cyanide (Illustrated).

Rockford Chapter
Birthday Meeting in September
Watch for further announcements.

Notes on Hardening of High-Speed Cutting Tools

By A. N. GODDARD

MEMBER A.S.T.E.

President

GODDARD & GODDARD COMPANY

WITH all the plethora of books, pamphlets, and articles on this subject it seems hardly within reason that the writer could add even so little as a single thought that would be of service to those interested in this subject.

From the research and scientific standpoint, the American Society for Metals monthly publication, "Metal Progress," and its quarterly, "Transactions," probably stand without a peer in continuous contribution of information. From the practical standpoint, that Society's annual Handbook offers dependable information though of a rather general character.

When asked to contribute an article on this subject as a long-time manufacturer of high-speed metal-cutting tools, the topic assigned was, "Don't's for Hardening High-Speed Steel Tools."

Having an inherent antipathy for emphasis on negatives and a better respect for emphasis of positives, I assumed the present title but will endeavor to compromise, giving fair value to both "Do's" and "Don't's."

I remind the reader, however, to bear in mind that of which I am fully conscious—that is, to expect nothing new and startling on the subject. The only excuse for saying anything is that one may often make real progress by stopping at times to thoughtfully review previous knowledge on a subject; and secondly, the fact that younger men are constantly coming into the picture and generally are anxious to know of the experience of older heads. On this basis is this article submitted.

Twenty years ago, even ten years ago, high-speed cutting tools not infrequently failed because of faulty steel—segregation, seams, hammer bursts, etc., in the bar or forging—or because of faulty hardening—strain cracks, grain growth, lack of uniformity of hardness, etc. Perhaps it would not be unreasonable to say 50% of tool complaints could in those days be traced to one of the two above causes.

Causes of Tool Failures

Speaking particularly from the standpoint of milling cutters, it may be said that not 10% of tool failures are due to either or both the above causes today. A rather critical study of tool failures of the present time (and tools do still fail) divides the 90% of these among such causes as:

a. Improper sharpening (clearance, run-out, etc.).

b. Ruined temper through use of improper grinding wheels—hard and coarse grain, loaded wheel, etc.

c. Incorrect speeds and feeds.

d. Improper cutting lubricant or coolant or lack of it altogether.

e. Poor mechanical condition of the machine.

f. Inadequate fixtures or devices for holding the work.

g. Lack of study of the job and consequently tools not properly designed for it.

h. Material not uniformly annealed—hard or even chilled spots. Other causes appear from time to time, but the above covers the more common difficulties.

Any cutting tool manufacturer realizes that whenever a job on which his tools are being used is not running satisfactorily, the tool is always the cause, and most generally it is claimed faulty in heat treatment. Patient investigation, the application of light and not heat, generally finds the real cause, which can then be corrected. May I be pardoned for this seeming digression from the immediate subject and now endeavor to confine myself more closely to it?

Some Do's and Don't's

DO—be patient in your search for knowledge. Nobody can put explicit experience down on paper. And there is no substitute for experience.

DON'T—expect to find too much experience on the printed page, nor to gain it in short order from actual practice. Heat treating of tool steels is more than a trade—it is an art, and it cannot be acquired quickly.

DON'T—get discouraged with unsatisfactory results. Mr. Johansson once answered the question, "What is the real secret of the stability of accuracy of your blocks?" thus: "It is infinite patience."

DO—seek continuously the data of performance of the tools you purchase or harden yourself, through cooperation so far as possible with the user. Study carefully this data together with data as to what treatment the tool had. Study the tool that did unusually well as also the tool that was unsatisfactory.

DO—draw conclusions very carefully, but—

DON'T—draw conclusions hastily nor from one or two trials only. The older men in the game will tell you it is cumulative data tending strongly in one direction or the other that indicates further methods.

DON'T—accept the criticism that failure of a tool to satisfactorily perform is always due to faulty heat treatment. It may be; and again, it may not. Tool manufacturers, for many years, have had this criticism to contend with, and still do.

DO—realize that the heat treatment of a cutting tool is only one stage of its manufacture. What is done to the tool in process of manufacture before and after heat treatment may and often does contribute quite as much to its right or wrong performance.

DON'T—take it for granted that hardness of a tool as recorded by one of several good machines for testing same is the sole measure of its cutting ability.

DON'T—fail to recognize the controversial nature of hardness readings on the same make of testing machine but by different operators. Sometimes it is the "personal equation" for which allowance has to be made in all observance of scientific data. Sometimes it is a variation of hardness or trueness of the diamond point. Sometimes it is the difficulty of presenting the surface to be tested correctly to the diamond.

DO—appreciate that it is of vital importance to know the comparative hardness of a tool, and manufacturers of machines for determining this have made a large contribution to the increase of knowledge of heat treatment, but more factors than simply degree of hardness influence the merits of a cutting tool.

DON'T—think a tool manufacturer (if you deem him worthy of consideration as a source of supply) willfully supplies you with poorly hardened tools. His own self-interest would preclude that.

DON'T—try to tell your tool manufacturer just how he should design and harden your tools, what brand of high-speed steel to use, at what temperature to quench, at what temperature to draw, whether to single or double draw, etc. You may know this information; but if you are a Tool Engineer in a plant, or a tool supervisor, you have many duties and endless problems of design—jigs, fixtures, etc. You have tool supplies to maintain. You have constant supervision of proper tool usage and care of tools. If you don't know the last word in the heat treatment of all the various tools you are responsible for, it is no reflection on your ability or suitability for your job. These details are what you pay the tool manufacturer for. Therefore, expect to receive what you pay for. Is this an unwarranted deviation from the subject of this article? I don't think so, nor would you if you could see the numerous requests we receive to use a certain brand of steel and heat treat it in a definite way.

DO—this as a means of best serving your job. Call in the cutting-tool engineer in your problem. Present the full picture to him—what the operation is, what the material is, what quantity of production is required, what type of machine the job is to go on, what fixtures for holding the work, what limits

of accuracy required. Having done this, hold him responsible for the best tool for the job, promising him in turn your full and intelligent cooperation in use of the tools. In this way your best success will be assured.

Some years ago I was called into conference with the works manager of a large plant in the East in just this way. The problems were many and serious; but together they were solved to his entire satisfaction. My own satisfaction was in the fine cooperation he gave in designing most suitable fixtures for properly holding the work. I actually believe that he got about double the work out of a milling machine that would ordinarily be expected because of this cooperation. An interruption, however, occurred in this set-up after it had been under way less than a year. After a good start this whole job was turned over to his tool supervisor, who very soon began to design and specify his own cutting tools. Unsatisfactory results followed. The tool supervisor was then advised to change his method in these words: "Your job is not to attempt to design your own drills, taps, reamers and cutters. Your job is to know the best sources of supply for these various tools, make use of their specialized and cumulative knowledge, and then cooperate with them in correct use and maintenance of tools and equipment."

DON'T—think just because an 18-4-1 high-speed steel is used, 2350° F. is the only correct temperature at which to harden a tool and 1050° F. the correct drawing temperature.

DO—understand that a difference of only a few points in the carbon content of this steel very materially affects the hardening and drawing temperatures for best results.

DO—remember that hardness (to the point of brittleness) and toughness are diametrically opposed qualities. Both are desirable in an efficient cutting tool. The tool manufacturer should know the job requirements sufficiently to decide intelligently what best carbon content of steel to use and govern his heat treatment accordingly.

For example, we have had complaints from a customer that our tools were not hard enough. They dulled too quickly and as a result the teeth broke out. It took time to convince the party, after our own analysis of the trouble, that the tools were too hard. Minute chipping of the cutting edge and then abrasion made it seem like too soft a tool. Ultimately the trouble was corrected by drawing to a lower temperature, thus increasing toughness.

Again, trouble with another job from teeth breaking out of an expensive cutter and the criticism was "improper hardening." This was a mass production job on which the margin of profit was narrow. The trouble was found to be an insecure holding of the work. It would roll slightly at times when the cutter entered or was part way through. Proper clamping would slow down production to the point of vanishing profits. The only thing to do was to draw the cutters to a lower hardness, increasing toughness to the point of reducing breakage. This shortened the life of the cutter but seemed better economy than slower production which more secure clamping would have required.

DO—appreciate that scientific research at great expense has been for years, and still is, an indispensable adjunct to every tool steel manufacturing concern.

DO—appreciate that many new types of high-speed steel have been developed and some have made a lasting contribution in the way of better tools—but—

DON'T—forget that 18-4-1 high-speed steel, first introduced at the turn of the century, was and still is the outstanding contribution from the art of steel making to better tools. Through the years its process of manufacture has been constantly improved. Methods of heat treatment of it have also improved. Every new tool steel brought out has served as an incentive to seek still unrevealed resources in 18-4-1. And this intensive research has been richly rewarded. "Moly steels," "high carbon high vanadium steels," "cobalt steels," have all made their contribution, and doubtless will make further contributions. It is in no disparagement of these that we thus speak of 18-4-1. We would not for a moment take the conservative position that the best high-speed steel has arrived. It can be safely conceded, however, that to date no better steel for general all-around dependability has been produced.

DO—remember also that progress in the knowledge of heat treating has been a long, slow, uphill road through the last thirty years. Quacks, nostrums, secret formulae have had their innings and the cost has been enormous. Probably their end is not yet. One hardly dares to take the superior and egotistical attitude that a new process is too absurd to entertain, yet we have emerged from most of these erratic experiments sadder, wiser, and poorer.

I suppose if one could know the time, the effort, and the expense involved in the attempt in past years to produce "cast" high-speed tools, the facts would be staggering. Only in this present year, 1938, however, have I been approached with the serious statement that it is possible to produce "cast" high-speed steel cutters that will do double to treble the work of any cutters made from hammered or rolled stock. If we grant this (knowing that high-speed steel is much more difficult to produce than lower grades), we must acknowledge that all of the rolling mills and forging hammers of the country for the purpose of refining the structure of steel are a huge mistake and the greatest waste of money ever perpetrated in industry. (These remarks do not apply to such non-ferrous cast materials as stellite or carbide alloys. In this article we are dealing with high-speed steels only.)

In the search for a more durable cutting edge dare one venture a guess at the expense that has been incurred in trying to improve the hardened quality of a tool by chrome plating? Yet what percentage of high-speed tools are so treated today? And why?

When chatter (intermittent hammer blows from work on tool) breaks down a cutting edge—

DON'T—say it's faulty hardening.

When tools are improperly ground—too much, too little rake—temper drawn from use of wrong wheel—

DON'T—say it's faulty hardening.

And what more shall one say? The subject could be carried on ad infinitum. To prophesy is dangerous. To wish is futile. To hope is pardonable. Marvelous progress has been made in the last thirty years by the tool steel manufacturer in producing better steels. I believe it is only fair to also say that like progress has been made by the tool manufacturer in making available to the user of cutting tools the last ounce of goodness the tool manufacturer has put into the steel, but let us be very thankful that we have not arrived yet, for after that is stagnation.

What do we want in a PERFECT high-speed cutting tool?—the hardness of a diamond, the toughness of a high cobalt steel, and non-changeability in heat treatment. Some goal to be sure! But why aim at less?

HEBERT RECOMMENDS SPEAKERS' CLUB TO ALL CHAPTERS

The Speakers' Club of Detroit Chapter, A.S.T.E., was initiated several years ago to afford an opportunity for Tool Engineers to study public speaking, and to provide a forum where they could discuss "on their feet" various topics of interest to them and at the same time have the benefit of a professional instructor.

F. C. Hebert, president of the Detroit Speakers' Club, points to the remarkable progress that has been made by his club's members. He recommends it highly to other Chapters of A.S.T.E., and will be pleased to supply any information desired. The club meets one night each week and the course is divided into a ten weeks term in the fall with another similar term in the spring. Once each year it has been the custom of the club to have a dinner—a fairly elaborate banquet, semi-formal, providing an excellent opportunity for members to prove to their own satisfaction the value of the training they have received.

Says Mr. Hebert, "The value of the club is easily proven by the fact that each year the membership has grown and that members of the original classes have already spoken for membership in the coming term."

For further details address the National Offices, Detroit.

Oil Hydraulic Controls Adaptable for Use With Electrical Circuits

HYDRAULIC control units upon machine tools, presses, molding machines, and various other installations sometimes are of the type which are designed to be used in conjunction with electrical circuits. Usually the reason for this is that the work being done is a process which is most easily timed or measured by electrical means. In a few cases, the reason is that the installation is one which can be originally made somewhat more conveniently by combining electrical circuits with hydraulic control circuits.

In those instances where it appears that electrical circuits should be used in connection with the hydraulic control, it is important that reliable electric-hydraulic standardized control units are available. Solenoids are usually used to actuate hydraulic control valves of this type, thereby functioning to translate a timed electric impulse into a resultant hydraulic function. Most of the major advantages of hydraulic control may in this way be retained, while the special consideration requiring electric operation can still be satisfied.

The typical hydraulic circuit diagram shown in Fig. 1 is reproduced for the purpose of illustrating the possible use of several types of electric-hydraulic control units. A Vickers Solenoid Operated "Traverse & Feed" Panel has been indicated as being the unit required for controlling the rapid advance, adjustable feed rates, and rapid return movement of a machine table or head. The hydraulic action within the panel itself is in turn controlled by cams or dogs on the table and also by two integrally mounted solenoids. Feed rate adjustment dials are provided upon the panel, and either one or two adjustable feed rates are available for use if required. The "Fine Feed" rate and the "Coarse Feed" rate are independently adjustable, and if the second feed rate is not required it may be totally disregarded. The length of travel of the working stroke is adjustable by moving the control cams in the "T" slot at the side of the table or head. Fig. 2 is a photograph of a solenoid operated panel of the type described.

A Vickers Solenoid Operated Four-way Valve is also shown in the typical circuit, its function being to control the operation of the clamping cylinder. The same type of foolproof solenoid mounting is used as that which is used upon the panel unit. Action of the solenoid valve is controlled by proper limit switches or interlock switches, similar to those shown.

Illustrative of another electric-hydraulic unit of Vickers' manufacture, a Vickers Pressure Switch, has also been indicated in the typical circuit. It functions when a predetermined clamping pressure has been attained, and is connected with the electric circuit in such a way that the feed and traverse action cannot take place until the clamping pressure has been built up to the proper amount.

Fig. 2. Vickers Solenoid Operated Hydraulic "Traverse and Feed" Panel.

There is, of course, a practically limitless number of possible circuits which can be worked out to obtain various sequences of action for various applications. For these many possible situations the Vickers organization has developed a large number of standardized control units which are available from stock. These hydraulic control units are available in several sizes and with many modifications. A complete engineering service is maintained for working out control problems in cooperation with the Engineering Departments of machinery manufacturers. Inquiries concerning this service, which is rendered without obligation on the part of the inquirer, should be addressed to Vickers, Inc., 1416 Oakman Blvd., Detroit, Michigan. Catalogued information on all Vickers Oil Hydraulic Pumping and Control Equipment is also available.

Fig. 3. Vickers Solenoid Operated Four-Way Valve.

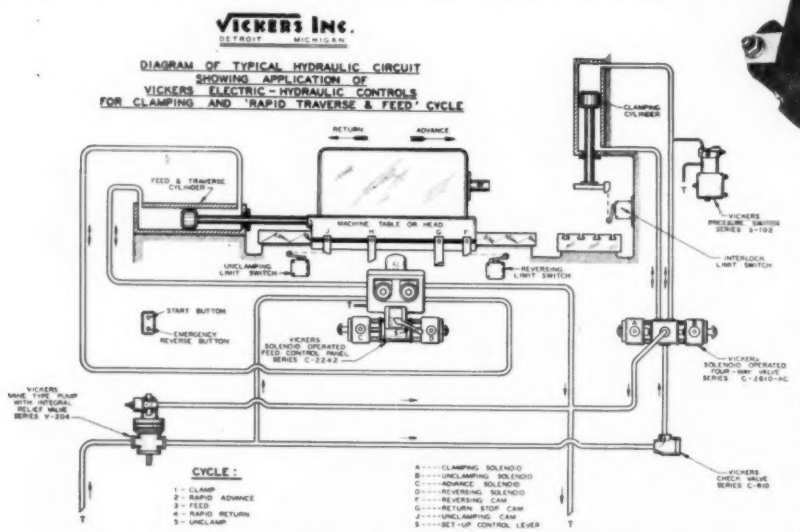
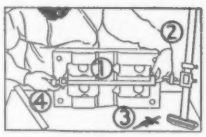

VICKERS INC.
DETROIT MICHIGAN
DIAGRAM OF TYPICAL HYDRAULIC CIRCUIT SHOWING APPLICATION OF VICKERS ELECTRIC-HYDRAULIC CONTROLS FOR CLAMPING AND 'RAPID TRAVERSE & FEED' CYCLE
RETURN
ADVANCE
CLAMPING CYLINDER
FEED & TRAVERSE CYLINDER
MACHINE TABLE OR HEAD
UNCLAMPING LIMIT SWITCH
REVERSING LIMIT SWITCH
INTERLOCK LIMIT SWITCH
START BUTTON
EMERGENCY REVERSE BUTTON
VICKERS SOLENOID OPERATED FEED CONTROL PANEL SERIES C-2242
VICKERS SOLENOID OPERATED FOUR-WAY VALVE SERIES C-2810-AC
VICKERS VANE TYPE PUMP WITH INTEGRAL RELIEF VALVE SERIES V-204
VICKERS CHECK VALVE SERIES C-810
CYCLE:
1 - CLAMP
2 - RAPID ADVANCE
3 - FEED
4 - RAPID RETURN
5 - UNCLAMP
A - CLAMPING SOLENOID
B - UNCLAMPING SOLENOID
C - ADVANCE SOLENOID
D - REVERSING SOLENOID
F - REVERSING CAM
G - RETURN STOP CAM
J - UNCLAMPING CAM
S - SET-UP CONTROL LEVER

Fig. 1. Hydraulic circuit diagram showing possible use of Electric-Hydraulic Units.

You Can't Beat STARRETTS For This Job

Starrett Verniers have been the final authority on close inspection work for over half a century. Their sure accuracy and absolute dependability have won them a place in every well equipped tool crib . . . and the confidence of every skilled craftsman. Starrett Catalog No. 26T describes and illustrates the complete line of Starrett Verniers as well as more than 3000 other fine precision tools. A copy free on request.



The tools shown above are:
1. Starrett Vernier Caliper No. 122
2. Starrett Vernier Height Gage No. 454
3. Starrett Vernier Depth Gage No. 448
4. Starrett Steel Rule No. 410

THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy Dial Indicators for Every Requirement

Standardize on STARRETT TOOLS

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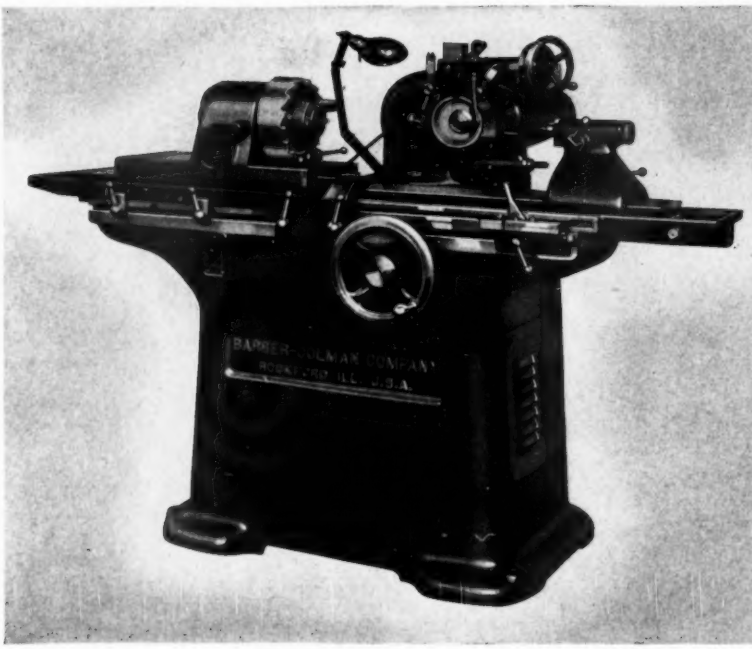
GOOD NEWS!

About Sharpening Reamers, Hobs and Milling Cutters



ANNOUNCING
Barber-Colman
Combination Sharpening Machine
***New* PRECISION**
***New* SPEED**
***New* CONVENIENCE**

Gone are the days of "by guess and by gosh" in sharpening Reamers, Hobs and Milling Cutters. The new Barber-Colman Combination Sharpening Machine gives remarkable new precision, new speed, new convenience, new economy. This machine is set up instead of "rigged up". It has a big, rigid, box-section base which provides a solid foundation for the machine elements. It gives *positive mechanical control* for all of the sharpening operations. It has self-compensating bearings on the spindle which automatically eliminate end play . . . affords diameter control in "tenths" . . . vernier adjustment of helix . . . unique accurate index, and many other advantages born of our Hob Sharpening Machines and Reamer Sharpening Machine, without their more costly specialized automatic features. For *any make* of Reamer, Hob or Milling Cutter, for diameters to 6" and 8"; stroke length, straight gash 24", highest spiral, 8"; regular or irregular spacings; odd numbers to 15, even numbers to 20. The Barber-Colman Combination Sharpening Machine is Good News for the Tool Room, for the men who supervise, the men who pay the bills. It is Big News, interesting and profitable. Write today for details. Ask for Bulletin 1486.

For sharpening reamers, hobs and milling cutters singly or in small lots, the machine shown above is ideal. For large volume sharpening of hobs, formed milling cutters and Barber-Colman Reamers our special automatic machines are unexcelled.

BARBER B-C COLMAN PRODUCTS
MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

BARBER-COLMAN COMPANY
General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

The machine illustrated in this advertisement is now available for distribution only in the United States of America.

Save dollars

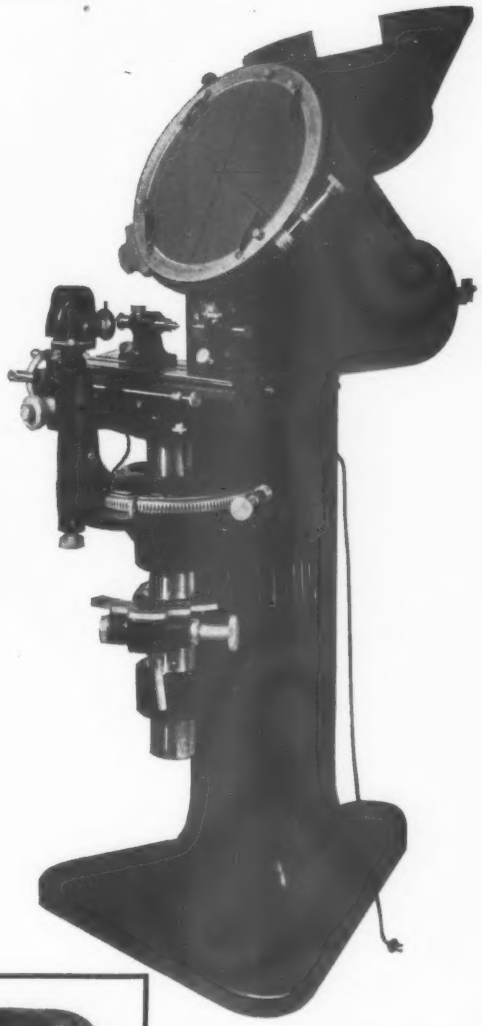
on profile gages

WITH THE J&L COMPARATOR

For inspecting irregular forms quickly, where mechanical gaging is awkward and difficult, the gaging field of the Comparator is almost unlimited. *One Company in a few months time has saved the cost of over seventy profile gages by the use of J&L Comparators* (name on request).

The magnified shadow of the part is compared or measured with a master outline. Any shop man with a few minutes instruction can operate the machine with speed and precision. On production work, it is possible to study tool wear, hardening distortion and many important details which cannot be definitely measured by any other means.

Our representatives, with years of engineering and inspection experience, will gladly survey your inspection problems with you.



J & L PEDESTAL COMPARATOR

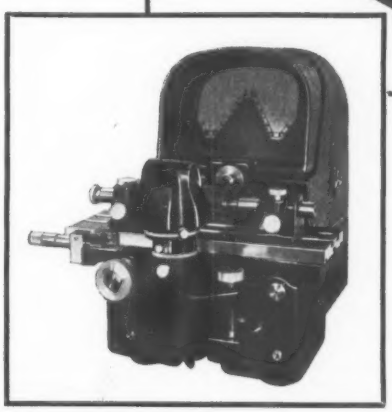
IT WILL MEASURE angles in degrees and minutes; lead or spacing; height or depth.

•

IT WILL PHOTOGRAPH the enlarged shadow.

•

IT WILL COMPARE objects with a master outline.



J & L BENCH COMPARATOR

JONES & LAMSON MACHINE CO., Springfield, Vermont, U. S. A.

Handy Andy's . . WORKSHOP . .

It's vacation time (for those who can get it) so we turn our minds from tools (when we can) and think of golf and moonlight by the lakes. "Away from the madding crowd," you know. Personally, I've always had a yen for the small town, where everybody knows everybody and neighborliness prevails. Coming in from the lake t'other Sunday night, we ran into a storm, and to make matters worse my generator quit, the lights getting dimmer and dimmer. We were on the Ann Arbor Trail, so I cut over to Plymouth, stopped at the first likely gas station.

▲ ▲ ▲

"Can't do a thing for you, mister," said the attendant. "But let me wipe your windshield. It's all muddy. . . . No, that's all right, glad to do it." At the next place, the proprietor fussed with wires, checked the battery, cleaned terminals. "It's your generator, all right, but I can't fix it. You go down here a ways and you'll be taken care of." No charge, no sirree! At the next place, a capable mechanic spent fifteen minutes, fixed it. "How much?" "Oh, nothing. . . . Well, if you insist, a dime. I tell you, mister," silencing my protests, "the trouble with the world today is that there's too many people trying to get rich at the expense of their fellow men. Glad to have helped you. Come again." His name is Hines, Plymouth and Mill Road. Thanks to him and to the Spirit of Plymouth, a friendly town.

▼ ▼ ▼

Now here's another one. When friend wife and I trekked down to Florida last winter, a young couple looked after the home in our absence. The young wife so endeared herself to our girls that when we took a cottage for the summer nothing would do but that she spend a couple of weeks, especially as she was "expecting." Well, I got out there end of the first week, everything fine. But 3 A.M. Sunday the wife woke me up. "Get her into town quick!" was the gist of her remarks. And did I!—the stork setting a stiff pace. We beat him to the tape by a close margin, although I didn't find that out until later. Congratulations!

▼ ▼ ▼

The little woman and anxious hubby safely delivered (at their home), I started back for the cottage, still dark. Knew I was getting short of gas, but nary a station open, so I traveled on, hoping. Then, 'way out, pop-pop! "Oh! oh!" So I cut the switch, threw her in neutral to save priming, and let her coast, stopped at a cluster of gas stations a couple of miles along. All closed. Resignation, watchful waiting, thumbing an occasional driver. No soap. Then, the voice of the Early Bird from a nearby asparagus field. "Out o' gas, mister? Well, I can let you have a gallon or so out o' my tractor." Was I glad! The farmer (?) came along after a bit, poured it in. "Oh, gimme a dollar. I wouldn't charge you nothin', only I need the money." "Okay by me," I said, and paid. Got in, stepped on the starter, and off—for a scant half mile. Then pop-pop, pssss. "Oh, hell!"

▼ ▼ ▼

In the chill gray of dawn I fussed around, trying to locate the trouble. No lack of fuel this time. Looked at the wires, opened the fuel pump. Water!—plenty. "What the——!". Drained the carbureter, then, thinking water had settled at the bottom of the tank, opened the drain. The fluid ran in globules along my greasy hand, water to the last drop. I pushed the car clear, tried to light the pool with a match. It was water, all right—all of it. And you know, I had to laugh, it was so funny. Some tractor that farmer (?) had. Maybe he forgot to give me the pills that turn water into gasoline.

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I got gas after a while, then, the engine purring smoothly, settled down to enjoy the dawn. A rabbit streaking across the road, a mother quail and her brood, tripping single file; a nye of pheasants, gorgeous cock and drab hen, some half-grown chicks running confusedly, like barnyard fowl. Purple martins on the road; never saw 'em grounded before. A squirrel lugging something?—a baby! Set it down, cuffed it, picked it up again. Off! A mourning dove by the roadside, the challenge of a flock of crows, a pair of blue cranes lazily winging. Back at the cottage at last, the sun just soaring up over the hills. A brace of ducks speeding past, a hell-diver skimming the lake below

This is a Combination DAVIS Boring Tool!

It happens to be made (except for the cutting units themselves) of transparent Lucite; and was designed for use solely as a "demonstrator" at tool conventions. But it does graphically illustrate the truly wonderful adaptability and possibilities of specially-designed DAVIS Boring Tools.

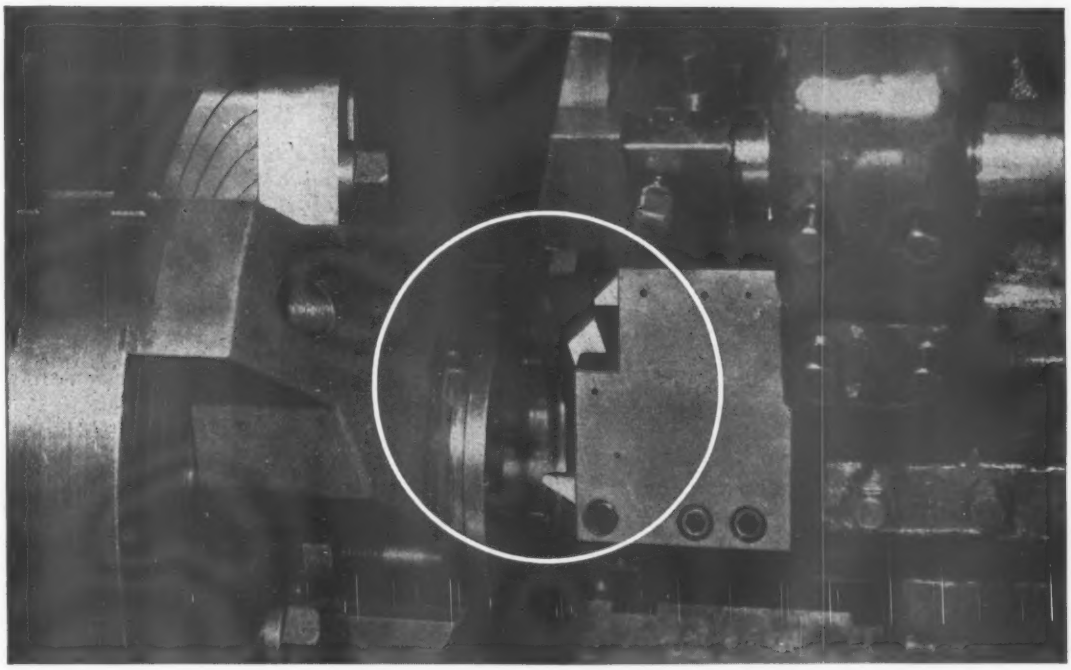
If you have an unusual boring job—a particularly difficult boring job—a too-high-in-cost boring job, it will pay you to find out just what specially-designed DAVIS Boring Tools can do for you.

Send us prints of your work, and let our Engineering Department make you a specific recommendation. No obligation. Write today.

DAVIS BORING TOOL DIVISION, Larkin Packer Co., Inc.
ST. LOUIS, U. S. A.

DAVIS BORING TOOLS

Only Haynes Stellite "2400" tools stood up on this machining job



In finish machining this 5½-inch diameter alloy gear blank, four Haynes Stellite "2400" tool bits are used. Three of the tool bits chamfer, while the fourth turns the outside diameter.

IN the job illustrated, four Haynes Stellite "2400" cutting tools are used in finish machining alloy steel blanks for airplane pump drive gears. The gears are made of a tough, heat-treated steel with a Brinell hardness of approximately 300. Haynes Stellite "2400" cutting tools are the only tools which have stood up and maintained the desired production on this difficult machining job.

Haynes Stellite "2400" metal is tough and abrasion-resistant, even at the red heat at which the edge of the tool normally operates. It has a low coefficient of friction. Therefore, this alloy can be run at higher cutting speeds and will produce more pieces per grind. These advantages help to increase production and reduce tool and manufacturing costs.

Write the nearest Haynes Stellite office today for "Haynes Stellite '2400' Metal Cutting Tools," a new booklet with pictures and operating data on all phases of machining with these superior tools. A copy will be sent you without obligation.

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

2400 HAYNES STELLITE TRADE MARK

A red-hard, wear-resisting alloy of Cobalt, Chromium and Tungsten

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Foreign Sales Department—New York City

Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 46 apparatus shipping points of The Linde Air Products Company

them, a clear winner. Oh, life is good and the world is rosy—at dawn. Yet, the setting sun but hints at the morrow's resurrection.

▼ ▼ ▼

I hear, with a feeling of personal loss, of the demise of Carl Dahlquist, of Swartz Tool Products. I liked Carl, genial and kindly, so typical of that warm friendliness so characteristic of him. First "Chuck" Sweeney, fine Christian gentleman and Chief Engineer; now Carl, Tool Engineer par excellence and their Sales Manager. Sunset, a prelude to dawn.

▼ ▼ ▼

In the Workshop, I have given a boost when I could; a pat on the back for one "arrived," encouragement to a comer. Now, this is for the benefit of employers who may be looking for a likely youngster, just the kind you've been looking for. O. B. Jones (Prex of D.C.A.S.) sent him to me, a star student. I put him to work, the Old Man willing, and he justified all recommendations, showed mathematical and designing ability, had ideas. But the "recession" came on, and he was laid off along with other good men. But that boy didn't wait for "something to turn up"; he went after it, took what came along, the spirit of independence. I want to see him placed, recommend him highly as a man who will keep plenty of jumps ahead of the paymaster; not much on talk but there in performance. His name is Len Johnson, Junior (or Student) A.S.T.Eer, and you can get him through Headquarters, or O. B. Jones, or me. Call this an ad if you will, but the biggest (and only) compensation I get on this job is doing a good turn when I can. Now, someone do me (and themselves) a favor by giving this boy a break. He's the right sort.

▼ ▼ ▼

Just paid my dues (confession being good for the soul), and if that jolts some other delinquents I'll tell you that they're giving the swellest gold-plated cards now. Oh, we're going up in the world, we A.S.T.Eers. Among other things, we're going to semi-annual in Pittsburgh this coming Oct., V.-P. (and next Prex—remember that) Jim Weaver and his gang extending themselves to give us all a whopping time. And that guy makes good! We'll all be there, eh? Also, we've started the ball rolling for the next A.S.T.E. Tool Show, and will that be big thunder! Yessir, I'm telling you, this A.S.T.E. is the fastest growing outfit of its kind on earth, and we're just gathering momentum. I've told you that right along; now get on the band wagon.

Yours for progress,
HANDY ANDY.

The TRANSPARENT
SOLUTIONS
MADE POSSIBLE BY
"Stuart's
CODOL"
Liquid Grinding Compound
INSURE BETTER WORKMANSHIP
Phone or write today for Free Working Sample and 24 page booklet describing this highly recommended modern grinding lubricant.
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PITTSBURGH—HOST

(Continued from page 9)

October 15, will be devoted to plant tours, affording those who missed certain tours on Friday an opportunity to take in further plant tours Saturday afternoon. Those who may not care to visit plants may be interested in attending Carnegie Institute of Technology and Holy Cross football game. Arrangements have been made for members to enjoy the privileges of several golf courses in the vicinity. Members may attend technical sessions while various officers are attending business sessions.

William Penn Hotel To Be Headquarters

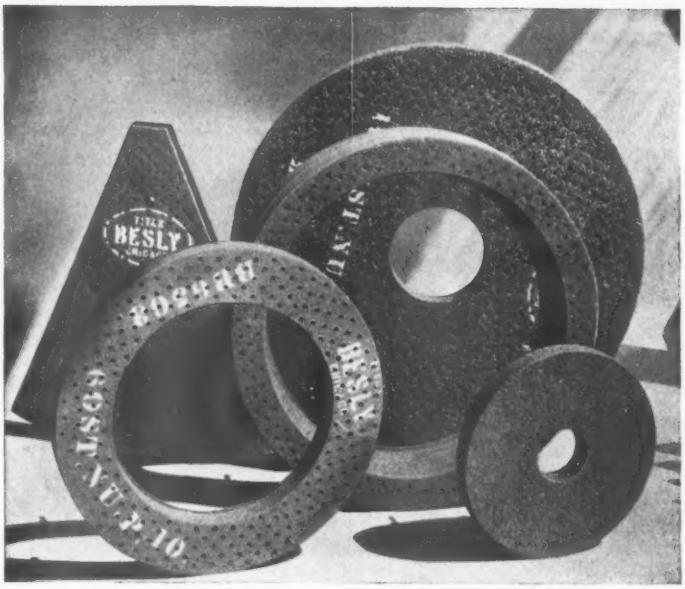
The William Penn Hotel in downtown Pittsburgh will be convention headquarters for this meeting. Special rates have been granted for all A.S.T.E. members and delegates to this convention.

Excursions Planned by Many Chapters

Various units of the twenty-two chapters of the American Society of Tool Engineers are working on their individual arrangements. Special excursions have been planned by several chapters while others have planned "An All Expense" trip which will include transportation to and from Pittsburgh from the chapter city, as well as the hotel accommodations at the William Penn Hotel. As an illustration, Detroit Chapter is making arrangements for running a special low-priced excursion to the convention and it is anticipated at this early date that no less than two hundred members from the Detroit area alone will make the trip. Contact your chapter officers for full details regarding arrangements from your city to Pittsburgh.

See next issue of "The Tool Engineer" for more complete details of this meeting.

BESLY TITAN STEELBAC ABRASIVE DISCS



The list of users of Besly Titan Steelbac Abrasive Discs reads like the roll call of the world's most progressive manufacturers. • Those who are truly wide awake realize the advantages of this Bolted-On Resinoid Bonded grinding member. • Safe—Economical—Free Cutting—Long Lived—Easy to Mount—Practically No Waste. In other words, the best thing of its kind ever developed. You don't have to accept our story without proof. Try these Wheels on your Blanchard, Pratt & Whitney, Diamond, Osterholm, Bridgeport or any face grinding machine. Originally developed for the Disc Grinder but are now also widely used on these other machines. They really have merit.

Write for your copy of Booklet on Besly Titan Steelbacs.

LET US SEND YOU FURTHER PARTICULARS

CHARLES H. BESLY AND COMPANY

118-124 NORTH CLINTON STREET ★ CHICAGO, ILLINOIS

My dear Mr. Rylander:

Perhaps I had best start this little note with congratulations on your fine work in "The Tool Engineer" Magazine, and this is genuine, not simply a bouquet of flowers. I think you are doing a fine job not only in your own editorials but in the selection of material for the magazine.

Possibly the time has arrived when you always have a great surplus and have to select the best from the quantity of material in hand. If so, this letter is useless; but if, on the other hand, there are times when you wish very much you had some short article to fill out a column, I am submitting the following interesting quotation from an old book—"History of the Lumber and Forest Industry of the Northwest," by George W. Hotchkiss, published in 1898.

"In 1663 an attempt was made to run a saw mill by water power in England, but its menace to hand labor, led to such violent opposition on the part of the people who saw so much danger of throwing the working people out of the means of earning a livelihood with hand saws the project was abandoned. A mill established in East London in 1767 to run by windmill power was destroyed by the mob who saw in it only a device to take the bread out of their children's mouths."

From the above it is to be observed that "technological displacement of labor in industry" is no new thing. We think we have some very complex and serious labor problems to solve today. As a matter of fact, a great many of us think that no problems in the past were quite as serious as those of the present. The trouble, however, is that we are always in the midst of the present and we cannot see clearly through the murky waters. When we look back through the pages of history where the mud has had time to settle and we can see through the waters clearly, we can see the same problems. And I suppose if we could see clearly through the waters for the next five hundred years, we would see these same problems coming up periodically and the people tremendously disturbed over the same things that are disturbing us today, although presented in perhaps slightly different form.

The reason for it all seems to me to be they are always the problems of human contacts. We have made great progress up to the present in discovering the materials of the earth and adapting them to the needs of mankind. We have discovered the laws of nature and harnessed them to the comfort and convenience of mankind, but in the simple problem of human relationships we make infinitesimally slow progress. If we could only take the long range view of these things, we would have much more patience in the present; we would waste a lot less nervous energy; we would live more happily; and, I believe, more successfully.

Yours for what it's worth,
A. N. Goddard

Detroit, Michigan.

Roy:

Suggest that you run this, not because of the personal slant but because it's an exceptional letter, with the clear philosophy of a matured mind. It is a better editorial than I could write.

Andy.

We are glad to publish this letter, along with Mr. Rylander's comment, which is typical of the informal but considerate manner in which the editorial committee works.—Editor.

▼ ▼ ▼

Gentlemen:

Well, Andy, you did it again with that editorial about "Nut Crackers and Engineers." All of your editorials have been of a very high order, but this seems to be one of your masterpieces. There has been a general slopping over of the value of college men in industry, perhaps not more than 10% of whom are graduates; but the theory seems to be that just because a man has gone to college for a year or two, he is better fitted for a certain job than someone who never went to college, but has a background of practical experience supplemented by reading and studying technical trade journals, etc.

I was particularly pleased to note that you have presented a typical example which will depict in a way that it takes more than a college education to carry on manufacturing activities. That after all, practical experience is as much a necessity as a year or two in college. I could not help but write you to let you know how much your editorial was appreciated, not only by myself but many, many others whose comments have expressed the same thought.

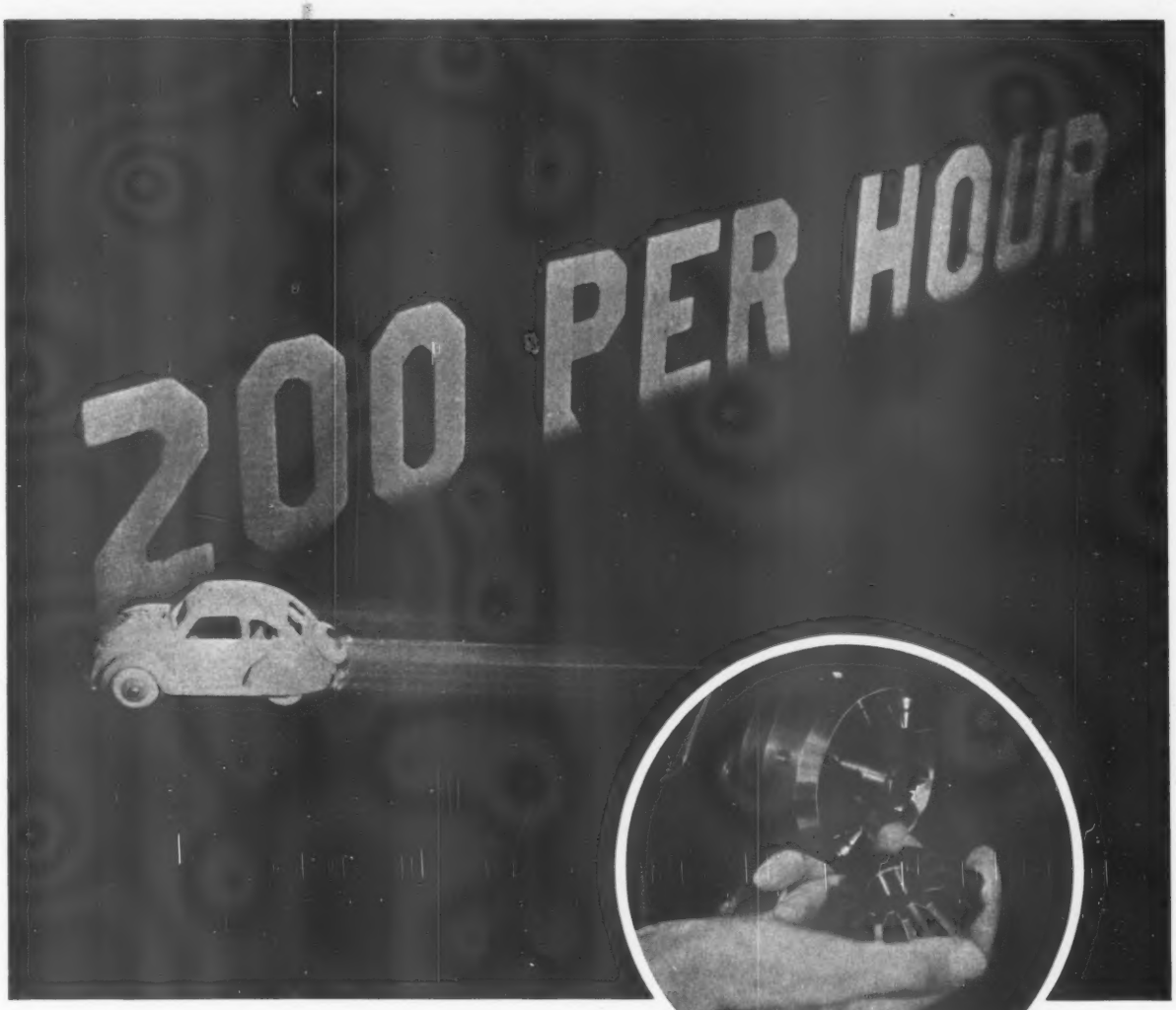
Yours very sincerely,
(Signed) Eugene Bouton,
Chapter Chairman

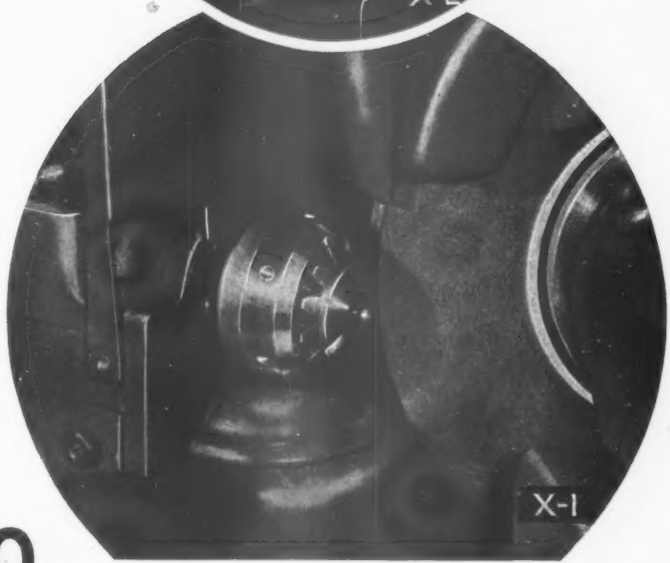
1024 Main St.
Racine, Wisconsin.

We are pleased to know that you liked the editorial and appreciate your interest in writing us. Have you other suggestions for material which you would like to see in this publication?—Editor.

GORTONS and
HOOVER
CLEANING ENSEMBLES
The bag ring necessarily gets a lot of handling from users of Hoover Cleaning Ensembles. Each time the bag is emptied the ring has to be removed and then replaced dust-tight. The Hoover Company makes the bag ring of a plastic material, the molds for which are produced on the Gorton Duplicator at large savings over former methods.
The 9 cavity mold originally used required 56 hours of tool labor per cavity, a total of 504 hours. With a Gorton Duplicator, after the first cavity was tooled out, it was used as a master for reproducing the other 8 cavities in 8 hours each. The tool labor for the mold was thus reduced to 120 hours, a saving of 384 hours or 76%.
Ask us to show you what we have done in reducing die and mold production costs.
GEORGE GORTON MACHINE CO.
1111 18TH ST., RACINE, WIS.

200 PER HOUR





Here is a simple high production machine getting results that may interest you.

The operation is grinding the spherical portion of rear axle differential pinions. The machine is a Landis 6" x 18". Workhead is hand oscillated. Two hundred pieces are finish ground per hour removing .006" stock.

This is typical Landis performance, and is another reason why you should entrust Landis engineers with the solving of your next grinding problem. 262

PRECISION LANDIS GRINDERS

LANDIS TOOL CO.

WAYNESBORO, PENNSYLVANIA

CHAPTER DOINGS

(Continued from page 19)

Morgan Park just south of Beloit, Wis. Competition was keen in both sports and the enthusiasm ran riot.

John Fagerstrom won the low gross score while 'Hash' Johnson from Ingersoll Milling Machine Co. won the low net score. The contest was close which added to the interest of the occasion. **The Rifle Match also provided a most interesting time** for the marksmen who were entered. **First place was won by 'Hub' Olson. Second place went to 'Hash' Johnson.**

"While the **dinner** was **scheduled for 6:30, it was 8 o'clock before the boys got around to eat. No wonder they all raved about the swell eats.** All in all, everyone enjoyed the day and the season **for meetings was officially closed until next fall.**

Hartford chapter reports that plans are nearly completed for the coming season. **F. L. Woodcock,** Hartford Chapter Secretary, says, **"An even bigger and more successful year is expected. This past year made history among local engineering circles and extended the services of the 'Engineers' throughout the State and into neighboring States. The membership has nearly quadrupled.** Two important outings were held: both with outstanding success, socially and financially. The exchequer is in substantial shape and **plans which have waited upon means will now come to fruition.**

Technical meetings for the coming season may be expected to mark an even higher degree of quality than that past. **Speakers have been engaged for all dates.** Topics have been selected with broadest possible appeal and variety.

Regular business and technical sessions are to be held on first Mondays of each month, starting October 3, continuing through November 7, December 5, January 9 (second Monday due to legal holiday, February 6, March 6, April 3, and May 1. Members, friends, and other readers within the jurisdiction are requested to note these in their engagement books. All technical or mechanical men interested may receive personal notification of meetings upon application to the Chapter Secretary to be placed on the mailing list.

St. Louis Chapter had its last meeting of the season June 17th. **C. A. Birkebak of the Ex-Cell-O Corporation was the speaker on the subject, "Precision Production Boring,"** and illustrated his talk with slides. This was followed by an after-lecture discussion "which was both helpful and interesting," says **Chapter Publicity Man R. E. Laffler.**

Detroit Chapter's golf tournament was **a huge success judging from** Publicity Chairman **Gilliam's reports.** So successful was it that the **19th hole lasted until midnight** with no chance to get in a business meeting which had been planned. **Several scores of 78 were turned in with Burt Carpenter registering a score of 76 to win the tournament and the trophy.** Other prizes awarded were for (1) the most balls lost in the river, (2) the longest drive, (3) the longest putt, and (4) the prize for the winner of the kicker's handicap. **Floyd W. Eaton and Fred C. Hebert,** it was said, **insisted on playing the game according to their own rules.** They were "cold," so they said, and therefore played "winter rules" by teeing the ball on fairways. Considerable refreshments were consumed during and after the tournament.

York, Pennsylvania, on **June 21st** was the scene of the installation of A.S.T.E. **Chapter No. 22.** A committee had previously met on June 2nd, with the result that an invitation was extended to the National Officers to come to York to install and charter the local Tool Engineers into an authorized branch of the Society. As a result, **Ford R. Lamb, Executive Secretary, and Walter F. Wagner, President of the American Society of Tool Engineers, journeyed to York for the exercises.** After the usual formalities and a complete explanation of the workings of the A.S.T.E., an **election** of officers was held **resulting in W. S. Graby of the York Ice Machinery Company being elected the Chapter's Secretary. E. F. Noel, Treasurer; H. G. Weist, Vice-Chairman; and Gordon L. Reed, Chairman. This initial meeting of**

(Continued on page 39)

DO-ALL
BAND SAWING, FILING, POLISHING MACHINE

Spectacular Performance

• Model ML — newest Do-All Machine — does faster, smoother, more accurate work — both internal and external—on 48 different substances (up to 10" thick) from hardest high carbon steel to soft brass, copper, etc.

Only machine in the world with this wide speed range—50 to 1500 feet per minute. Does jobs in one hour which formerly required a whole day.

Actually, 3 Machines in 1

Convert in less than a minute from Band Sawer to Filer or Polisher.

Work table 24" square, tilts four ways. Throat 16" deep. Weighs 1300 pounds. Requires 33 x 25" floor space.

Equipped with exclusive JOB SELECTOR—tells instantly speed and kind of accessory to use on every material; latest SPEED GAUGE; automatic BUTT WELDER; MOTORS; 20 BAND SAWS; 4 FILE BANDS; 3 POLISHING BANDS, etc.

The Do-All has been adopted by leading industries because it pays for itself in four months on an 8-hour production schedule.

Let us prove its worth. A factory-trained man will bring a Do-All to your plant and show you exactly what it does, what it saves, on your own work.

CONTINENTAL BAND FILER

A new, efficient, bench model for rapid internal and external band filing. 32" high. Weighs 150 lbs. Only $88 without motor. See at your dealer's or order on 10 days trial. Circular free.

FREE — Hand Book on Contour Machining—100 pages of valuable metal working helps.

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tiny watch-movement parts!

A SURPRISING number of jobs—mostly of the parallel-surface type—are today being ground to almost unbelievably close limits on Gardner PRECISION Disc Grinders.

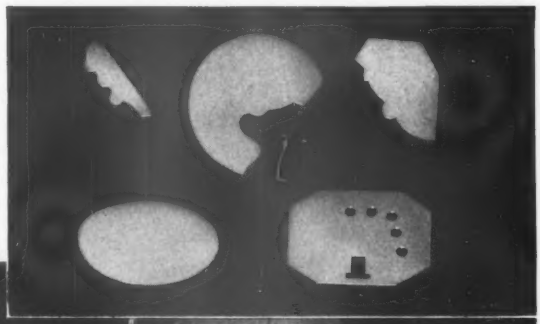
For instance, the tiny watch movement parts shown here, are handled by a Gardner No. 115—15" Double Head Machine. A rotary carrier brings the pieces between the opposed grinding members, the operator being required merely to load, as the work is ejected by a simple "kick-out".

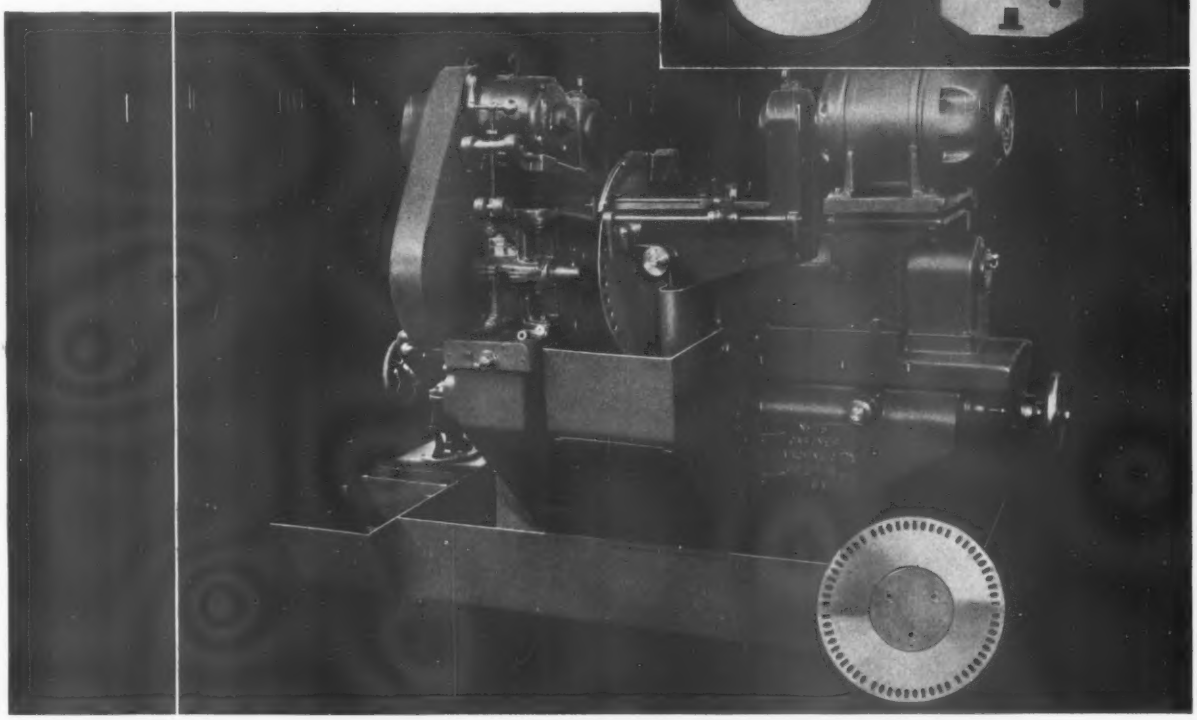
Stock removal runs from .010" to .015" over all, and the parts are ground within .00075" for flatness and parallelism, and within .001" for uniformity. PRODUCTION: 25 to 30 per minute!

Investigate

GARDNER
PRECISION
DISC GRINDING—

Write for full details!





GARDNER MACHINE COMPANY
442 East Gardner Street . . . . . Beloit, Wisconsin, U. S. A.

NEW Equipment

Federal Products Corporation New Improved Indicator—"V-8-I"

This new V-8-I indicator is what has been called the perpendicular spindle type; that is, the contact point is perpendicular to the face of the dial which permits the indicator to be used in positions where the regular type of indicator is not readily adaptable. This new indicator supersedes the former Federal Model No. 80 Junior.

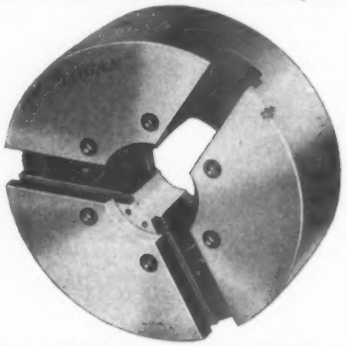
The principal advantages of this improved indicator are, that a crown gear is used in place of the previous spiral to change the direction of the gear movement. This results in a much more sensitive and more accurate indicator, it is claimed. The spiral was extremely difficult to make accurately, and created a considerable amount of friction within the indicator, it is said. This elimination of friction, however, has proved to be a very valuable feature in the Federal Indicators.

This indicator is also equipped with an oilite bushing in the ⅜" diameter size stems. This bushing is used in Federal Indicators because it further aids in the elimination of friction and results in a smoother operating instrument. The oilite bushing, as generally known, is a new development of a self-lubricating bronze type of bushing. Mention "The Tool Engineer" when writing Federal Products Corp., Providence, R. I.

"Logan" Chucks

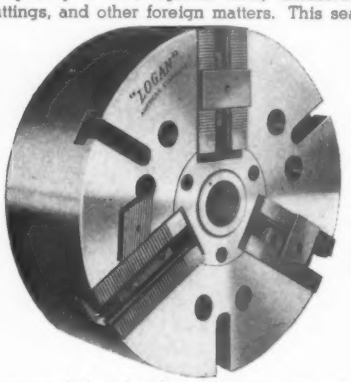
Logansport Machine, Inc., Logansport, Indiana, announces a complete new line of power-operated chucks designed to conform to the specifications of the American Standards Association as approved in November, 1936.

Among the more important features of the "Logan" line is the one-piece cast electric steel body, which is used in all models. The "Logan" Chuck body is cored for light weight and correct balance. Its uninterrupted sidewall, radially reinforced at the points of stress, offers, it is claimed, ample resistance to driving and gripping forces; and also insures minimum deflection and misalignment.



As a result, the new "Logan" Chucks combine extra factors of strength and rigidity with extreme compactness and light weight, it is said.

Positive lubrication is provided to all working parts to insure long life and efficient operation. All "Logan" models which are provided with pilot bushing supports are completely sealed against dust, abrasives, cuttings, and other foreign matters. This seal



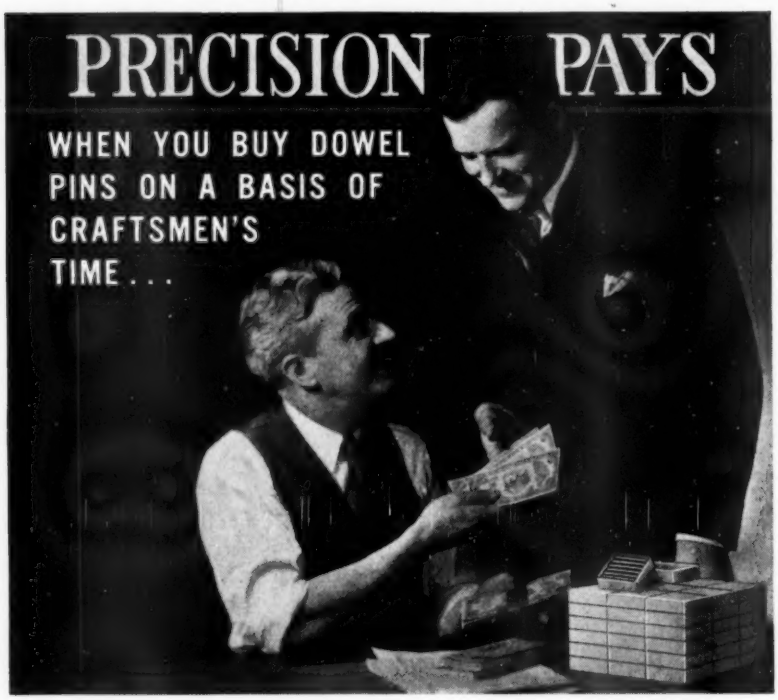
is accomplished by the sliding contact maintained between the master jaws and the under side of the pilot bushing support. The dust-proof seal and the pressure lubrication provide positive protection to all working parts of the chuck, it is said.

High-quality materials are used throughout. All operating parts are heat treated and precision finished. Jaw operating levers are drop forged chrome nickel steel. Lever pins are nickel steel alloy. Levers, lever blocks, and draw sleeve are designed with extra large bearing surfaces to resist wear and insure accuracy.

The new "Logan" Chucks mount directly on American Standard spindle noses, types A and B. The elimination of adapters offers decided advantages, accurate concentricity, simple installation, and reduced weight and overhang on the spindle. These chucks can also be used on American Standard spindle noses, type C; but in this require adapters to accommodate the 2-segment clamp ring used on the type C spindle.

Complete details, as well as a complete catalog illustrating and describing this new equipment, are ready for distribution. Mention "The Tool Engineer" when writing for your copy.

(Continued on page 36)



ACCURATE DOWEL PINS cost less than the time of the man who applies them—less than the job they do in production, hour after hour.

Included in the small cost of Danly Dowel Pins are the operations of hardening, grinding and individual inspection to maintain standards within ±1/10,000 of an inch.

The advantages are uniform straightness for the entire length so that the pin can be removed from its setting and driven back the reverse way. That also means that Danly Dowel Pins can be driven in or out of the holes without upsetting and without tearing or sticking. They are also available in .001" oversize for repair and renewal work, where holes have become enlarged in process or a reamer has cut oversize.

PRECISION PAYS. The sure way to secure it is to specify Danly Dowel Pins and all Die Makers' Supplies.

Danly Precision and Commercial Sets and Die Makers' Supplies F.O.B. from the 8 Danly Branch Office Stocks.

BRANCHES:

LONG ISLAND CITY, N. Y. . . . 36-12 34th STREET
DETROIT, MICHIGAN . . . . 1549 TEMPLE AVENUE
CLEVELAND, OHIO . . . 1745 ROCKWELL AVENUE
DAYTON, OHIO . . . 990 E. MONUMENT AVENUE
PHILADELPHIA, PA. . . . . 3913 N. BROAD STREET
ROCHESTER, N. Y. . . . . 16 COMMERCIAL STREET
MILWAUKEE, WIS., 513 EAST BUFFALO STREET

DANLY MACHINE SPECIALTIES, Inc., 2114 So. 52nd Ave., Chicago, Ill.

DANLY DIE MAKERS' SUPPLIES

DRILL BUSHING PLATES OF WEIGHTY CONSTRUCTION ARE EASILY HELD IN THE UP POSITION BY THE SWARTZ DOUBLE ACTION OR TWO WAY LOCKS

Ask For Catalog 238-8

SWARTZ TOOL PRODUCTS CO., INC.

5259 WESTERN AVE. **DETROIT, MICH.**

Cleveland—J. W. Mull, Jr.
Indianapolis—J. W. Mull, Jr.
Milwaukee—Geo. M. Wolff, Inc.
Tulsa, Okla.—Brammer Machine & Tool Service Co. Inc.

Represented by

Chicago—Ernie Johnson
Canada—Hi-Speed Tools, Ltd., Galt, Ont.

Oneida, N. Y.—W. F. Himmelsbach
Pittsburgh—J. W. Mull, Jr.
Toledo—J. W. Mull, Jr.
Philadelphia, Pa.—Morgan Tool & Equipment Co.

TRADE OK MARK

TEE SLOT BOLTS

FOR USE ON PLANERS, BORING MILLS, MILLING MACHINES OR OTHER MACHINES WITH SLOTTED TABLES

THESE bolts are manufactured in the same factory as the well-known "O. K. System of Inserted-Blade Metal Cutting Tools," and with the same relative care. They are forged of special medium carbon steel, heat treated for maximum toughness. The heads are milled accurately to size. With each bolt is furnished an O. K. nut of special design, in which nut and washer are incorporated into one unit. Having nut and washer integral eliminates time which is often wasted trying to keep tabs on separate washers. This flanged nut is made of the same tough steel as the bolt itself.

"O. K." Tee Slot Bolts may be obtained in any length, from 2" long to 24". A circular completely describing and pricing the line will be sent you on request.

THE O. K. TOOL CO., Shelton, Conn.

NEW EQUIPMENT

(Continued from page 34)

Improved M-B "Super-Speed" Air Grinder

For use on "tough" production jobs, the Improved M-B "Super-Speed" Air Grinder illustrated has been brought out by M-B Products, 130 E. Larned Street, Detroit, Michigan.

The body is of steel construction, and streamlined in design, which not only affords the utmost ease in handling, but permits of working in deep cavities.

The air is controlled by a positive quick-action valve. Outstanding features claimed for this tool are the high speed of 100,000 r.p.m., also the volume of power and the light weight of fourteen ounces. The spindle is of heavy construction, heat treated, and ground to close limits. Ball bearings are of the Bakelite retainer self-aligning type. A patented dirt filter in the hose line protects all working parts from dirt, scale, etc., in the

air line. Furnished with spindles to accommodate mounted grinding wheels, cutters, and other tools with either one-eighth or three-sixteenths in diameter shanks. A truly marvelous Portable Air-Operated Turbine Grinder.

Reconditioning Service on Gage Blocks Extended

Cost of precision measurement for many industrial firms will be reduced materially through a new service of the Ford Motor Company, Johansson Division, which extends reconditioning operations for the first time to gage blocks of two, three, and four-inch size.

Previously, reconditioning service had been available only for blocks of the five-inch size or larger. Under a secret process used by the Johansson Division, blocks which have become worn in service beyond their original accuracy can be renewed in most cases, thus virtually doubling their useful life at a cost considerably less than for new blocks. After such reconditioning, blocks are returned to their owners guaranteed to within their original accuracy.

The Johansson reconditioning service is combined with an inspection service by which gage block sets are accurately tested for size and possible "high spots." Blocks showing need of reconditioning can be serviced and returned to owners in about one week.

Brown & Sharpe Announce No. 2 Universal Milling Machine and No. 2 Plain Milling Machine

Addition of two new "Light Type" Milling Machines to their line is announced by Brown & Sharpe Mfg. Co., Providence, R. I., to be known as the No. 2 Universal Milling Ma-

No. 2 Plain L. T. with Power Fast Travel

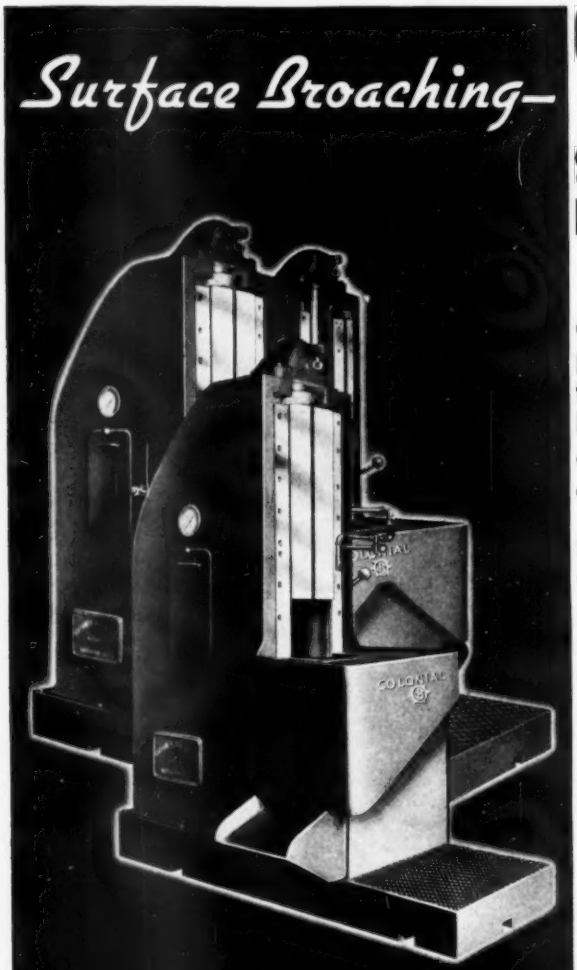
chine (Light Type—With Power Fast Travel) and No. 2 Plain Milling Machine (Light Type —With Power Fast Travel).

These new machines have all the advantages of moderate weight, ease of handling, ample rigidity, and modern construction characteristic of the Brown & Sharpe "Light Type" design. In addition, they have power fast travel of 76" per minute in all directions provided by a totally enclosed constant-speed motor built into the right side of the knee, and obtained (in any direction of feed engaged) merely by touching a switch button at the front of the knee. When the button is released, the table resumes its original feed movement. Since power fast travel is independent of both spindle and table feed drives, it is available at all times. The construction and location of the control button give maximum ease and simplicity of operation, and at the same time provide protection from grit, coolant, and accidental engagement.

The transverse and vertical adjustment handwheels are each automatically disengaged when power feed in the respective direction is engaged; while for longitudinal adjustments, a safety handcrank is provided.

An automatic lubrication system in the knee

(Continued on page 38)



COLONIAL'S
V A SERIES

SINGLE AND DUAL RAM—

are rapidly displacing other types of surface broaching machines throughout industry.

Speed, flexibility, and accuracy are the simple reasons for their tremendous popularity today. 6 to 25 tons. 30 to 60 inch stroke.

Send for Bulletins 104-9B & 9C

COLONIAL BROACH CO.
147 JOS. CAMPAU
DETROIT, MICH.

Colonial Broach Company, 147 Jos. Campau St., Detroit, Mich.
Please send further information regarding surface broaching and your bulletins Nos. 104-9B and 9C.

NAME_____

ADDRESS_____

PROCESSING BORES

(Continued from page 12)

generated. The bores were then finished with mechanically actuated honing tools, as shown in line "E," removing approximately .0005" stock. This combined processing produces accuracy averaging from .0002" to .0004" for roundness and straightness, and holds final surface finish uniform within 3 to 4 micro-inches in regular production.

Recent investigations of operating service conditions indicate the necessity of machining cylinder bores with the minimum obtainable structural deformation, to secure the maximum resistance to the three major causes of wear, which are: Corrosion, Erosion, and Abrasion.

Stock Removal in Process

The total amount of stock removed in generating cylinder bores is fairly uniform in the industry, and is approximately ¼" on the diameter, as shown in Fig. 3. In the one exception where total stock removal is approximately .157", the manufacturer uses the new casting technique previously described, comprising baked sand molds and pressure injection of the metal.

The amount of stock removal allotted to each operation and the number of operations used in present production vary greatly with different manufacturers. The examples here shown, which were taken at random, may be considered as representative of typical practice and give some indication of the variation of cuts. Thus, eight plants show a range of stock removal in rough boring, from .120" to .221" on the diameter, the average being approximately .155".

Somewhat closer agreement seems to exist in semi-finish boring, where the range of depth of cut in these eight plants is from approximately .020" to .084", the low exception again comprising use of iron which contains copper. The average of the other plants, using Ni-Chrome iron, is approximately .065".

Two plants employ a third multiple point finish boring operation; and the two other plants use single point precision boring as a third operation, with cuts of .024" and .015" respectively, the latter case again referring to the previously mentioned copper iron.

Relatively large variation exists in the reaming cuts used by five manufacturers, in the range from .009" to .032." The second example, here shown, represents the use of two reaming operations, comprising .021" stock removal in the first and .007" in the second cuts.

Rough honing, as used in six plants, ranges from .002" to .0045" in stock removal, with the majority removing approximately .003" with present mechanically actuated tools.

Finish honing, as used in two plants in a single honing operation following precision boring, removes .002" to .0025" stock, and where used as a secondary honing operation in five plants removes from .0005" to .0007" stock.

Editor's Note: The concluding part of this article will follow in an early issue.

JARVIS
VARIO-FLEX

The Jarvis-Vario-Flex is the only portable grinder maintaining a constant grinding wheel surface speed. Its unique design provides from 12 to 14 instant speed changes without stopping the machine or touching the belt.

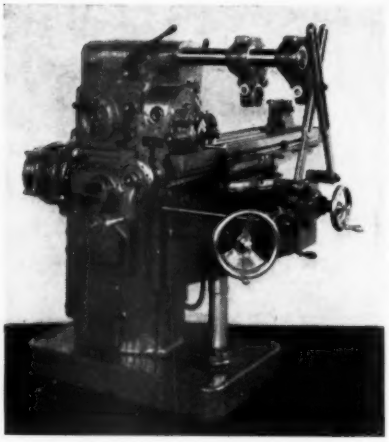
For example: A 10" vitrified wheel at 2200 RPM can be worn down to 4½" at 4700 RPM with a maintained speed of approximately 5500 surface feet per minute.

The sturdy construction of the entire machine with its 360 degree swivel motor, its rubber tired, ball bearing wheels, cold wound type Jarvis flexible shaft and double row, ball bearing hand piece, lends itself ideally for heavy snagging, cleaning of welds, polishing, buffing and similar operations.

Write for our new Catalog MST illustrating our complete line of flexible shaft machines, flexible shafts, power screw drivers and rotary files.

The Chas. L. JARVIS Co.

MIDDLETOWN, CONN.



No. 2 Univ. L. T. with Power Fast Travel

provides intermittent oiling for all mechanisms in the knee; while the table driving mechanisms, table ways, and bearing surfaces at the top of the knee are lubricated at each movement of the longitudinal feed engagement lever. The one-piece knee screw is enclosed in telescoping guard and is automatically lubricated.

Capacities: Longitudinal Feed, 28"; Transverse Feed, 10"; Vertical Feed, 15". All feeds automatic. On Universal Machine: Centers swing 10" diameter, take 28" length.

"Ultraspeed" Spot Welding

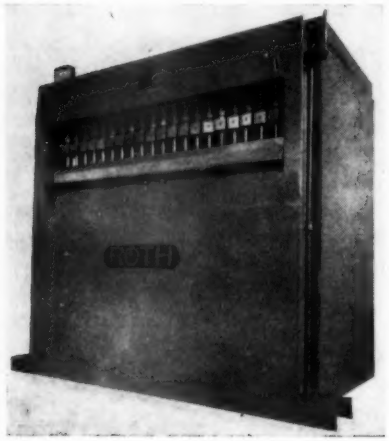
Roth Welding Engineering Company, Inc., 17147 Mt. Elliott, Detroit, Michigan, announced what is termed a Revolutionary Hi-Production Spot Welding Method allowing a welding speed of from 10 to 20 spots per second, which is five times faster, it is claimed, than Hydromatic Welding, Gun Welding, or any other spot welding method.

The operation of this new machine is very simple, it is claimed. A number of individual spot welding electrodes (as many as required) are put under pressure simultaneously, each electrode having a separate pressure spring and individual current connection. The welding current is supplied to the individual electrodes in rapid succession (10 to 20 shots per second). A special current distributing unit of extremely simple design has been developed for this purpose. After all welds are finished, the pressure is released simultaneously.

Advantages claimed for this new welding machine are: extremely high speed, clean welds of greater strength and uniformity than previously obtained in production welding, small transformer capacity, because of only one electrode welding at one time, the panels are held in perfect shape as the individual electrodes act as hold-down clamps and to a certain extent as forming dies, very simple machines, requiring a minimum of maintenance

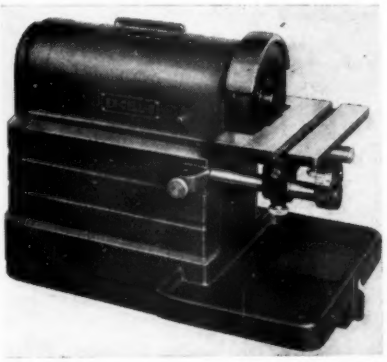
It is also claimed for the new machine that the number of spot welds which can be performed at any one time is practically unlimited since from ten to several hundred electrodes may be incorporated in the one machine

The Ultraspeed Welding Machine, it is claimed, has high value for high production assembling of sheet metal goods and wire goods in many industries—particularly in the automotive industries for the welding of bodies and certain chassis parts, automotive accessories, and factory equipment It also has widespread application, it is said, in the fabrication of steel houses, household machinery, stoves, metal furniture, electrical appliances, radio industry, refrigerators, air-conditioning, etc. Airplane manufacturing, railroad car assembling, wire mesh, wire racks, wire baskets and containers are other applications of the new type machine.



Low Cost Carbide Tool Grinder

Ready for delivery about August 15, will be the new low cost Carbide Tool Grinder recently announced by the Ex-Cell-O Corporation, 1204 Oakman Blvd., Detroit, Michigan. This new carbide tool grinder is designed to bring the advantages of high-priced



special carbide grinders in the range of the smaller shops and includes features which, it is claimed, are brought to the low-priced field for the first time, including the use of wet grinding with diamond impregnated wheels, permitting faster and more accurate grinding of carbide tools.

It is anticipated that the new diamond wheel machine (selling for $125 complete) will not only bring within the means of small shops having but few carbide tipped tools, but will also enable larger users of such tools to locate a number of such grinders around the plant, nearer to production machines—resulting in increased tendency on the part of the operator to keep his tools sharp, increase production and loss of time in taking tools to central tool departments for sharpening.

It is a single-end, self-contained motor-driven machine, with a ball-bearing spindle and a built-in coolant reservoir. Completely adjustable table, angle-setting dial, and protractor permit the sides, radii, and angles of round and rectangular right- and left-hand tools to be rapidly ground.

A dial with graduations clearly visible to the operator without stooping permits him to set the angle of the table accurately. This dial allows any angle from 90 to 115 degrees between the wheel face and table to be obtained. The tool rest table, mounted across the face of the wheel, has a slot for guiding a protractor, which is also graduated in degrees. The distance from the table to the wheel is adjustable.

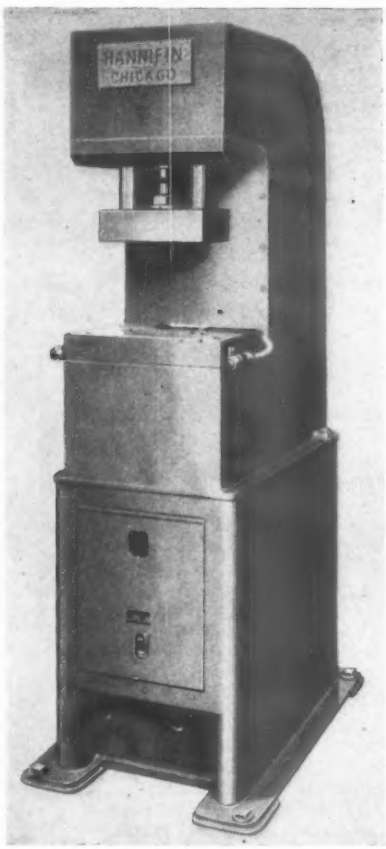
The spindle of this machine is journalled in ball bearings at front and rear. An electric motor, adjustably mounted inside the machine base, drives the grinding spindle through a "V" belt.

Overall height of the grinder is 14¾", width 13½", and depth 20⅝". Bottom of base to spindle center is 11⅜". Spindle driving motor is ¼ h.p., 1725 r.p.m. 110 volt, 50 or 60 cycle. Approximate weight, 135 pounds.

New Hannifin "Hy-Power" Hydraulic Press

Hannifin Manufacturing Company, Chicago, Illinois, have recently announced a general utility type "Hy-Power" hydraulic press embodying the "Hy-Power" operating cycle and available in capacities from 12½ tons to 60 tons, for pressing, forming, crimping, stamping, shallow drawing, and similar operations.

This new high-speed, semi-automatic hydraulic press is a compact, self-contained unit adaptable to a variety of operations. The press illustrated has a capacity of 12½ tons



and the complete operating cycle is approximately two seconds. "Hy-Power" hydraulic operation in this machine provides an automatically completed press cycle when the push-button control is pressed.

The "Hy-Power" hydraulic pressure generator is driven by a 2 h.p. motor in the 12½-ton press, and is located in the base of the

CHAPTER DOINGS

(Continued from page 32)

York Chapter No. 22 was visited by several members from the nearby chapters of Philadelphia and Baltimore. Much credit should be given Mr. C. H. Kidder, Industrial Secretary of the York Y.M.C.A., for his assistance and interest in forming this chapter of the Society.

Tool Engineers Not Yet Affiliated with the American Society of Tool Engineers

are cordially invited to communicate with New Chapters' Chairman, Roy T. Bramson, 2842 W. Grand Boulevard, Detroit, Michigan if interested in the formation of a local chapter of this rapidly growing engineering organization.

This Society now has twenty-two chapters in the major industrial centers of the country. There may not be a chapter in your community—if not, and you are interested—communicate with us for full details.

COMPETENT sales representative is desirous of obtaining sales rights on perishable machine tools. Can furnish representation for state of Michigan, excellent clientele, 20 years connection automotive industry, 7 years selling experience, excellent references if required. Box 505—"The Tool Engineer."

Mellon Institute of Industrial Research, of prime significance and interest to all engineers. Another of the interesting points that Tool Engineers will visit while attending the Semi-Annual Meeting.

NEW EQUIPMENT

(Continued from page 38)

press. The pressure generator unit is mounted on casters and may be removed by disconnecting two pipes. Only electrical connections are required for installation of the press. Operation is controlled by two push buttons at the sides of the table. Since both push buttons must be held down to operate the press, this insures that the operator's hands are clear. The press will not repeat if the push buttons are held down, as it completes but one cycle and then stops.

Specifications are: Capacity, 12½ tons (similar presses available in capacities up to 60 tons). Stroke, 3". Table to platen up 9". Center of ram to face of frame, 7". Platen (guided), 6" by 10". Table, 10" by 15". Base, 22½" by 34½". (Continued on page 41)

MAKE them purr along, turning out good production, accurately, without interruption, at low cost. Give them cleaned, lubricated air, at just the correct operating pressure.

Norgren Appliances do the trick—pay for themselves many times over, every year. Write for descriptive circular.

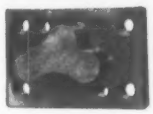
C. A. Norgren Co., Inc.

218 Santa Fe Drive Denver, Colorado

Boyar-Schultz PROFILE GRINDER

with

Sine Bar Adjustment



HOURS SAVED become DOLLARS EARNED

The time required to make and fit this Die and Punch by the usual method of filing, hardening and stoning was 12 HOURS.

The same Die and Punch fitted and finished complete, with the use of a Boyar-Schultz Profile Grinder, resulted in a saving of 7 HOURS. The Die opening is 2¼" x 1⅛". Approximately .025 was removed all around. An additional unseen advantage results by the removal of the decarburized surface from the cutting edge.

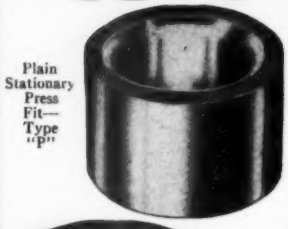
Boyar-Schultz PROFILE GRINDER will save YOUR time in fitting irregular shapes and contours for dies, punches and templates. WRITE FOR DESCRIPTIVE CIRCULAR.

BOYAR-SCHULTZ CORPORATION

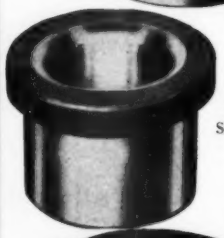
2116 Walnut Street CHICAGO, ILLINOIS

ACME

Standardized Drill Jig Bushings



Plain Stationary Press Fit—Type "P"



Shouldered Stationary Press Fit—Type "S"

Removable Slip—Type "R"

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in **hardened and ground** parts requiring **extremely close limits, lapped fits, etc;** also **hydraulic appliances** for pressures up to **20,000 lbs.** per square inch.

ACME INDUSTRIAL CO. 208 N. LAFLIN ST. CHICAGO, ILL.

PRATT & WHITNEY MOURNS DEATH OF RUSSELL B. HURLBURT

The passing of Russell B. Hurlburt on July 17, 1938, at his home, 62 Sunnyside Way, New Rochelle, New York, was a great loss to his associates in Pratt & Whitney, Division Niles-Bement-Pond Company, both in Hartford and New York, as well as to his wide circle of friends, both here and abroad. He was well liked by all who had worked with him.

Mr. Hurlburt has been associated with the company for 24 years and held many responsible positions. From 1929 to 1936 he was in Europe in connection with Foreign Sales in Paris, London, and Brussels. He was well known throughout England and the continent. For the past year Mr. Hurlburt has been in New York acting as Foreign Sales Manager for the company.

In commenting on his death, Clayton R. Burt, President of Niles-Bement-Pond Company, praised his energy and ability which has meant so much in the smooth working of the sales organization, and remarked on the wonderful future which was undoubtedly his, had he lived to enjoy it.

Mr. Burt said, "There are hundreds of friends of Russell B. Hurlburt here and throughout Europe who will mourn his passing. He had a sincere welcome in every large European shop."

A great many of his business associates in Hartford, including Mr. Burt, as well as the personnel from New York Office, were in New York to attend his funeral.

Mr. Hurlburt was a son of the Rev. Rollo F. Hurlburt, a retired Methodist minister and author of religious books, now ill in a hospital in Des Moines, Iowa. He was born in Epsworth, Iowa, on June 16, 1887, and was graduated from Cornell in 1910.

He leaves his wife, Mrs. Amy Budd Chapman Hurlburt, a daughter, Janet, and a son, Blair Hurlburt.

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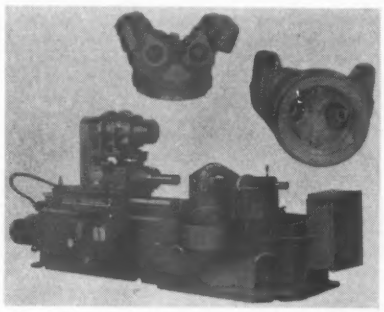
NEW EQUIPMENT

(Continued from page 39)

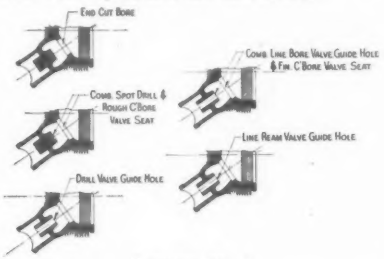
Natco Precision Boring Machine

The NATCO precision boring machine illustrated is being used by an aircraft engine manufacturer. It is performing a total of sixteen drilling, end cut boring, counterboring, line reaming operations on the valve seats and valve guide holes in the aluminum alloy cylinder heads which are also shown.

This machine is built of a Natco Holesteel Floor Type Unit and a two position hand indexed fixture mounted on a steel base. The Holesteel Unit is arranged with a special head complete with a single stub type precision boring spindle. One set of operations is performed with the fixture in one position and the second set of operations with the fixture in the second position. One operator



unloading, loading, changing tools and indexing fixture as required, maintains a production of from eight to ten cylinder heads per hour . The operations are as follows:


End Cut Bore
Comb. Line Bore Valve Guide Hole & Fin. C'Bore Valve Seat
Comb. Spot Drill & Rough C'Bore Valve Seat
Line Ream Valve Guide Hole
Drill Valve Guide Hole

Position No. 1

Operation No. 1—End cut bore valve guide hole for starting drill point.

Operation No. 2—Comb spot drill for valve guide and rough counterbore valve seat.

Operation No. 3—Drill valve guide hole.

Operation No. 4—Comb. line bore valve guide hole and finish counterbore valve seat.

Operation No. 5—Line ream valve guide hole.

Position No. 2

Operation No. 1—Comb. spot drill valve guide hole and rough counterbore valve seat and throat.

Operation No. 2—Drill valve guide hole.

Operation No. 3—Core drill valve guide hole.

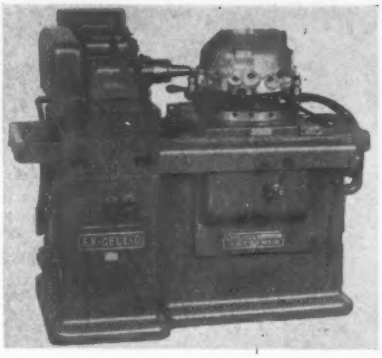
Operation No. 4—Comb. line bore valve guide hole, finish counterbore valve seat and chamfer.

Operation No. 5—Line ream valve guide hole.

For further details of this and other Natco Machines, address the National Automatic Tool Co., Richmond, Indiana, mentioning "The Tool Engineer."

Ex-Cell-O Single Spindle Boring Machine—Finishes 18 Holes in One Set-Up

Eighteen push-rod holes in the aluminum alloy valve-gear case of a nine-cylinder radial aircraft engine are bored in one set-up with the specially equipped Ex-Cell-O single spindle precision boring machine shown in the accompanying illustration.



The case is mounted on a rabbet and located radially by a flatted plug. Three strap clamps are then tightened. The fixture is indexed by hand. A spring loaded plunger is provided for accurate indexing, the plunger snapping into locating holes when the correct index is reached. The fixture is provided with a hydraulic cylinder to raise and lower the upper half of the fixture. It will be noted that the push-rod holes are half at one height and half at another. Eighteen buttons are provided on the lower half of the fixture to locate the work for height for each push rod hole.

The indexing table itself is locked by the hydraulic cylinder during the boring operation. Production is at the rate of 5½ cases per hour, covering 99 individual boring operations. The feed in this finish boring operation is only 1½ thousandths, with a stock removal of between 8 and 10 thousandths, and a length of cut of 1½ in.

The set-up was developed by Ex-Cell-O Corporation, 1204 Oakman Blvd., Detroit, for a foreign aircraft manufacturer.

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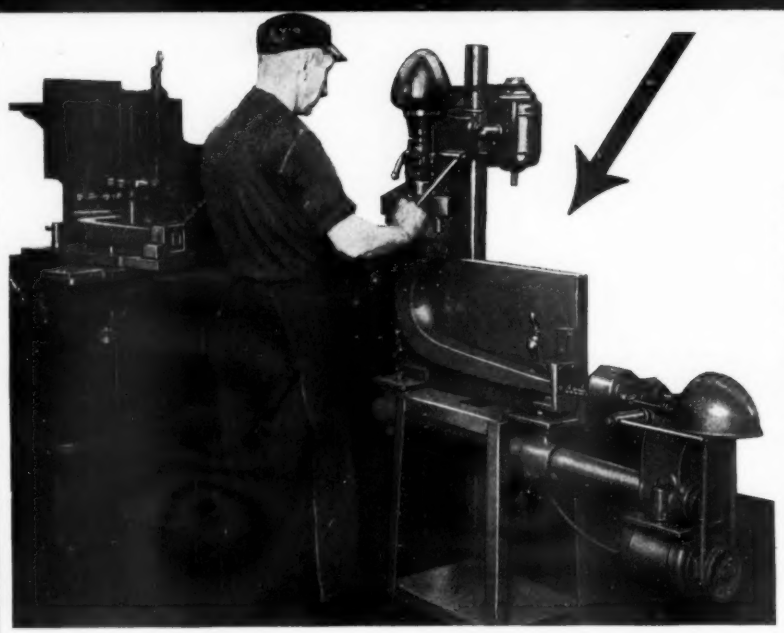

HOW TO PUT IDLE TIME TO WORK

This photograph shows the milling and drilling of an overarm for a scroll saw. The operator loads the arm in the milling machine, starts the first cut, then loads a previously milled arm into the special drilling fixture set beside the milling machine and drills four holes in the arm. By the time this operation is completed the first cut is finished on the milling machine. The arm on the milling machine is then indexed for the second cut, and, while this cut is being made, the operator transfers the drilled arm to another Delta drill and taps two holes. The drilling and tapping operations are done during the time that the operator would otherwise be idle—so these operations cost nothing for labor!

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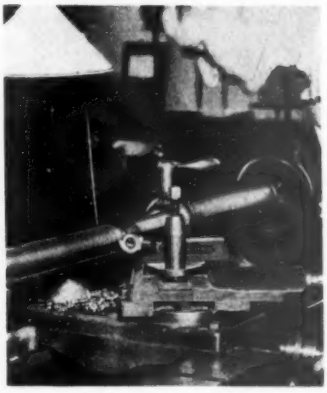

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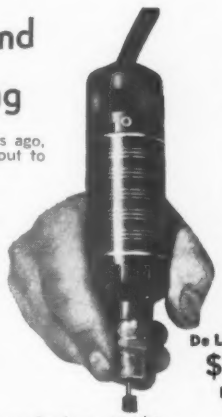

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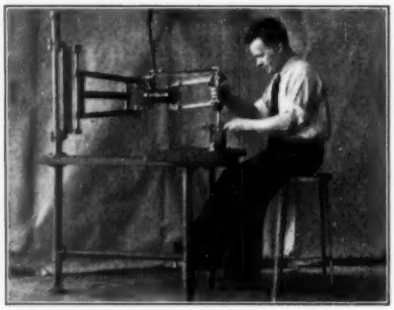

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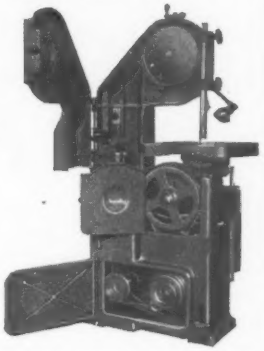

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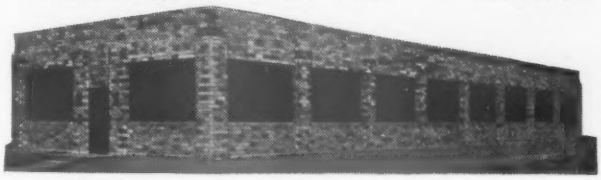

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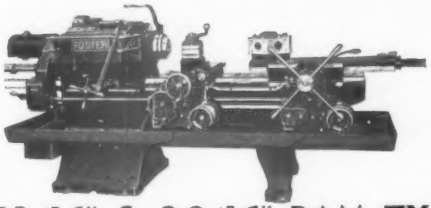

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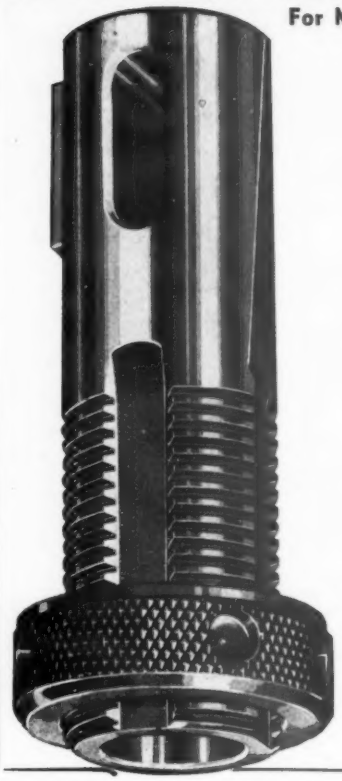

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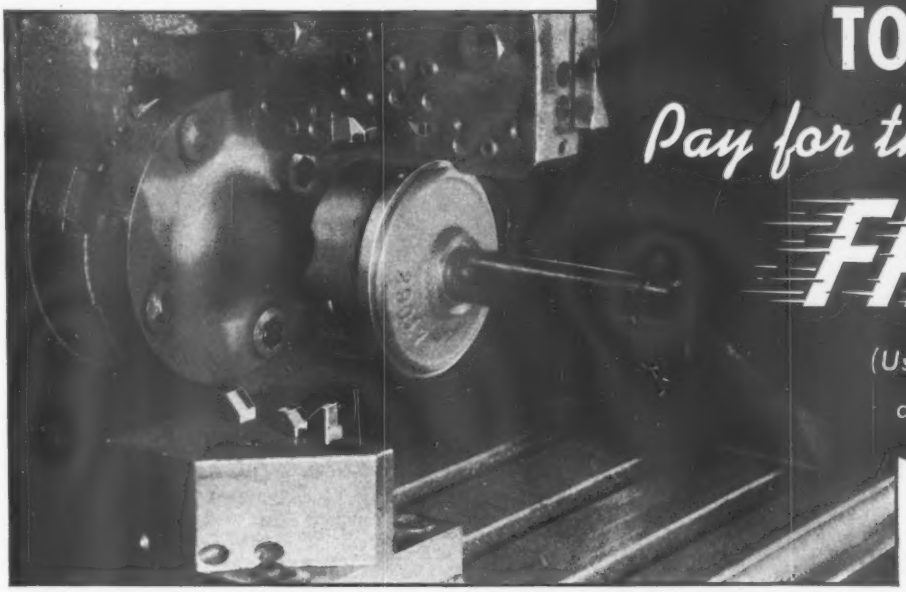

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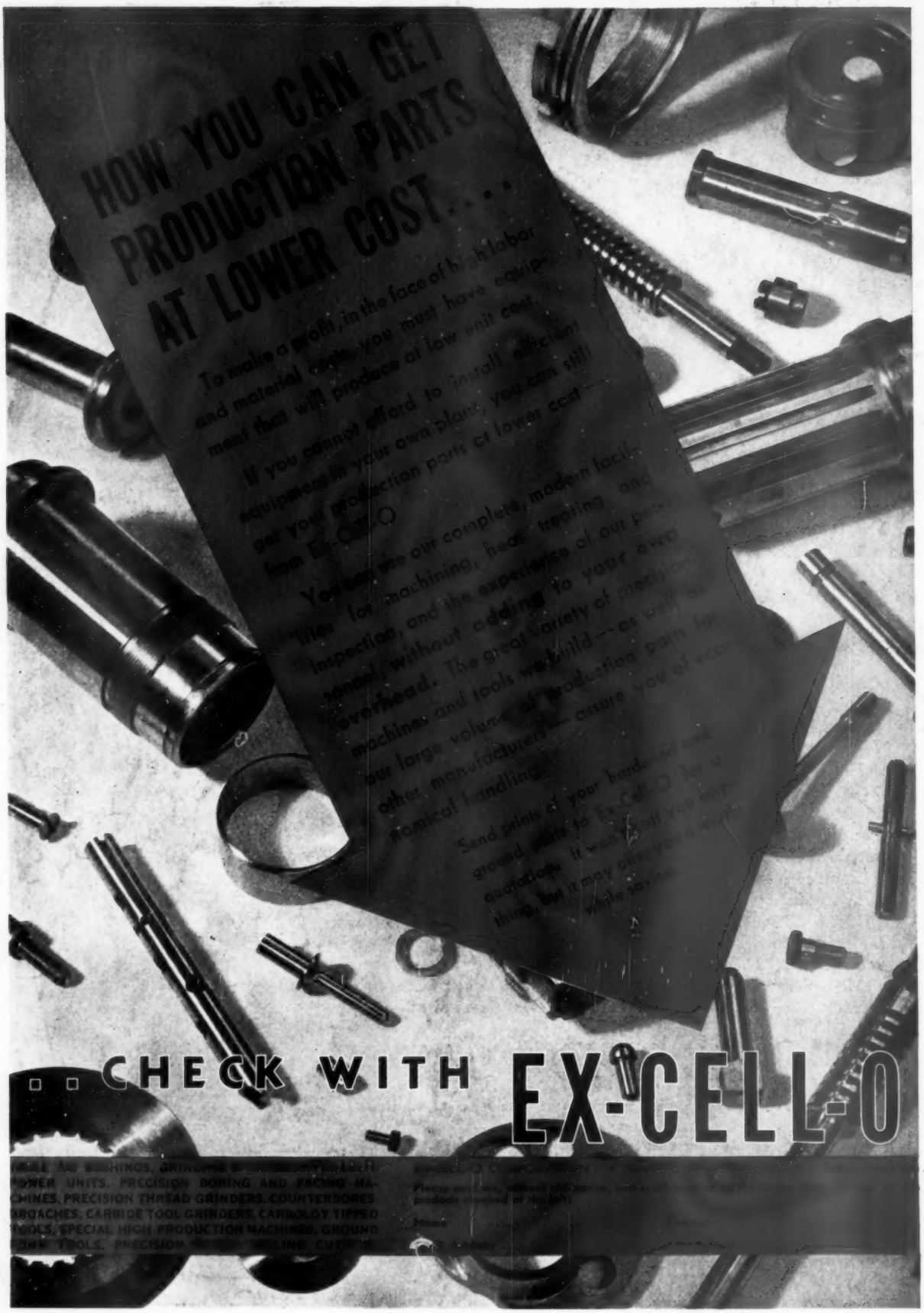
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